FINAL AS-ADMINISTERED ADMINISTRATIVE JPMS

FOR THE PRAIRIE ISLAND INITIAL EXAMINATION - AUGUST 2002

Facility: Prairie Island Date of Examination: 8/12/02

Examination Level (circle one): (RO) / SRO Operating Test Number: _____

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Conduct of Operations	Conduct Control Board Walkdown for Shift Turnover [Identify 3 of 3 errors on the Main Control Board] [K/A 2.1.3] [3.0/3.4] **[NEW, SIMULATOR]**
	Conduct of Operations	Perform Alternate Calorimetric [JPM RC-20, SP005B] [K/A 2.1.23] [3.9/4.0] **[DIRECT, SIMULATOR]**
A.2	Equipment Control	Prepare an Isolation for 11 Turbine-Driven Auxiliary Feedwater Pump [K/A 2.2.13, 2.1.24] [3.1/3.3, 2.8/3.1] **[NEW, CLASSROOM]**
A.3	Radiation Control	Determine Preparation Requirements for Emergency Containment Entry [K/A 2.3.10] [2.9/3.3] **[NEW, CLASSROOM]**
A.4	Emergency Plan	Phone in an Emergency Call to the NRC. The Red Phone will not work, the Operator must use another Phone and Call the NRC Commercial Number. [K/A 2.4.12] [3.4/3/9] **[NEW, SIMULATOR]**

Facility: Prairie Island
Examination Level (circle one): RO / (SRO)
Date of Examination: 8/12/02
Operating Test Number: _____

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Conduct of Operations	Conduct Control Board Walkdown for Shift Turnover [Identify 3 of 3 errors on the Main Control Board] [K/A 2.1.3] [3.0/3.4] **[NEW, SIMULATOR]**
	Conduct of Operations	Determine Maximum RCS Vent Time due to Voids in RCS [JPM Admin 10] [K/A 2.1.23] [3.9/4.0] **[DIRECT, CLASSROOM]**
A.2	Equipment Control	Perform Risk Assessment for 11 Turbine-Driven Auxiliary Feedwater Pump Emergent Work and Determine if Emergent Work Will Be Allowed to Proceed [K/A 2.2.17] [3.5] **[NEW, CLASSROOM]**
A.3	Radiation Control	Give Candidate Initial Conditions for an Emergency Containment Entry and Have Candidate Identify What Actions are Necessary [K/A 2.3.10] [2.9/3.3] **[NEW, CLASSROOM]**
A.4	Emergency Action Levels and Classifications	Classify an Event, Initiate Protective Action Recommendations, and Complete Emergency Notification Report Form PINGP 577 [K/A 2.4.38] [4.0] **[NEW, CLASSROOM]**

[redacted]

JPM A.1.a SRO/RO

Copy 1

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Conduct Control Board Walkdown for Shift Turnover | Job Performance Measure No: SRO/RO A.1.a

K/A Reference: 2.1.3 [3.0/3.4]

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance __ Actual Performance _X Classroom __ Simulator _X Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

Unit 1 is at 100% power with no testing or other evolutions in progress

Task Standard: IDENTIFY all operational limitations on the NSSS portions of the Main Control Board.
SRO: EVALUATE any Tech Specs NOT met and associated actions
RO: DISCUSS any operational limitations

Required Materials:
1. SRO: Unit 1 Shift Supervisor Turnover Log
1. RO: Unit 1 LPEO / PEO Turnover Log
2. Technical Specifications

General References:
1. SWI O-0, "Conduct of Operations", Attachment 14, Section 3.7.2, Rev 0
2. SWI O-2, "Shift Organization, Operations & Turnover, Rev 45
3. SRO: Unit 1 Shift Supervisor Turnover Log
4. RO: Unit 1 LPEO / PEO Turnover Log
5. Technical Specifications

Initiating Cues:

- You are the on-coming Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)
- I am the off-going Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)
- You are relieving the watch you were on 12 hours ago
- PERFORM a walkdown of the NSSS portions of the Main Control Boards as required per SWI O-0, "Conduct of Operations", Attachment 14, Section 3.7.2 and the Turnover Log
- IDENTIFY any operational limitations or concerns that you have
- I will write down any operational limitations or concerns that you have identified
- All lights have been verified to be functional
- You are NOT allowed to touch the Main Control Boards during the turnover

Time Critical Task: YES/NO Alternate Path: YES/NO

Validation Time: 20 Minutes Time Started _____ Time Finished: _____

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island
Task No: _____
Task Title: Conduct Control Board Walkdown for Shift Turnover
Job Performance Measure No: SRO/RO A.1.a
K/A Reference: 2.1.3 [3.0/3.4]

Examinee: _____
NRC Examiner: _____

Facility Evaluator: _____
Date: _____

Method of testing:
Simulated Performance __ Actual Performance _X Classroom __ Simulator _X Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

Unit 1 is at 100% power with no testing or other evolutions in progress

Task Standard: IDENTIFY all operational limitations on the NSSS portions of the Main Control Board.
SRO: EVALUATE any Tech Specs NOT met and associated actions
RO: DISCUSS any operational limitations

Required Materials:
1. SRO: Unit 1 Shift Supervisor Turnover Log
1. RO: Unit 1 LPEO / PEO Turnover Log
2. Technical Specifications

General References:
1. SWI O-0, "Conduct of Operations", Attachment 14, Section 3.7.2, Rev 0
2. SWI O-2, "Shift Organization, Operations & Turnover, Rev 45
3. SRO: Unit 1 Shift Supervisor Turnover Log
4. RO: Unit 1 LPEO / PEO Turnover Log
5. Technical Specifications

Initiating Cues:

- You are the on-coming Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)
- I am the off-going Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)
- You are relieving the watch you were on 12 hours ago
- PERFORM a walkdown of the NSSS portions of the Main Control Boards as required per SWI O-0, "Conduct of Operations", Attachment 14, Section 3.7.2 and the Turnover Log
- IDENTIFY any operational limitations or concerns that you have
- I will write down any operational limitations and concerns that you have identified
- All lights have been verified to be functional
- You are NOT allowed to touch the Main Control Boards during the turnover

Time Critical Task: YES/NO Alternate Path: YES/NO

Validation Time: 20 Minutes Time Started _____ Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___1___ Performance step: **CRITICAL STEP** SAT/UNSAT

PERFORM Main Control Board walkdown and IDENTIFY any operational limitations or concerns on the Main Control Boards.

Standard:

PERFORMS Main Control Board walkdown and IDENTIFIES all operational limitations on the Main Control Boards.

SRO: EVALUATE any Tech Specs NOT met and associated actions
RO: DISCUSS any operational limitations

The following discrepancies or problems will be identified:

	DISCREPANCY	TECH SPEC AFFECTED
1.	**11 Accumulator pressure at 600 psig**	**TS 3.3.A.1.b(4) and TS 3.3.A.2.e - 1 hour LCO, or be in HSD within 6 hours and CSD within 30 hours**
2.	**RHR Supply to SI Pump Suction Valves MV-32206(8816A) and MV-32207(8816B) indicate open by Monitor Lights on "SI Not Ready" Panel**	**TS 3.3.A.1.g(2) and TS 3.0.C - 1 hour LCO, or be in HSD within 6 hours and CSD in next 30 hours**
3.	**PRZR PORVs CV-31231 and CV-31232 are OPEN, PRZR PORV block valves MV-32195 and MV-32196 de-energized**	**TS 3.1.A.2.c(1)(b)3 - 1 hour LCO to close and remove power from block valves, and be in HSD within next 6 hours, and < 350°F in following 6 hours**

Comment:

CUES:
- **For RO, ask a followup question about operational limitations (if any) that are in effect.**
- **For SRO, ask a followup question to EVALUATE operational limitations (if any) that are in effect.**

EVALUATOR NOTE:
The safety significance and Tech Specs for the discrepancies must be discussed by the RO and evaluated by the SRO to receive full credit for each problem identified.
All 3 of 3 discrepancies must be found for the JPM to be evaluated as SATISFACTORY.

Terminating cue: After response to followup question has been discussed.

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

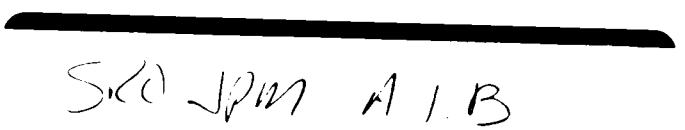
Initial Conditions:

Unit 1 is at 100% power with no testing or other evolutions in progress

Initiating Cues:

- **You are the on-coming Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)**
- **I am the off-going Unit 1 Shift Supervisor (SRO) / Unit 1 Reactor Operator (RO)**
- **You are relieving the watch you were on 12 hours ago**
- **PERFORM a walkdown of the NSSS portions of the Main Control Boards as required per SWI O-0, "Conduct of Operations", Attachment 14, Section 3.7.2 and the Turnover Log**
- **IDENTIFY any operational limitations or concerns that you have**
- **I will write down any operational limitations or concerns that you have identified**
- **All lights have been verified to be functional**
- **You are NOT allowed to touch the Main Control Boards during the turnover**

OPERATIONAL LIMITATIONS OR CONCERNS



Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island Task No: _____

Task Title: Determine Maximum RCS Vent Time Job Performance Measure No: SRO A.1.b

K/A Reference: K/A 2.1.23 [3.9/4.0]

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance __ Actual Performance _X_ Classroom __ Simulator _X_ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:
The Control Room has been evacuated due to a fire.
Both Units are being cooled down to Cold Shutdown in accordance with F5 Appendix B.
Attachment M has been implemented for Unit 2 due to the presence of voids in the Reactor Vessel.
RCS Pressure is 1750 psig

Task Standard: Maximum RCS venting time calculated to be 12.22 minutes.

Required Materials: Copy of F5 Appendix B, Attachment M, Page 3
Copy of F5 Appendix B, Figure 8

General References: F5 Appendix B

Initiating Cues:
The Unit 2 SS directs you to determine the maximum RCS venting time per F5 Appendix B, Attachment M, Page 3.

Time Critical Task: YES/NO Alternate Path: YES/NO

Validation Time: _20__ Minutes Time Started _____ Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___1___ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE Containment volume at standard temperature and pressure.

Standard:

Evaluator Note: This value is calculated by the formula:

Vcont = 1.32 x 10^6 x [492/(T + 460)] where T = Containment Temperature in Degrees F.

Containment volume calculated to be 1.1808 X 10^6 ft^3

Comment:

CUE: When candidate asks for Containment Temperature, inform candidate that, "Containment Temperature is 90 °F."

___2___ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE maximum Hydrogen volume that can be vented.

Standard:

Evaluator Note: This value is calculated by the formula:
Vmax = [(3.0%-CONC%)/100%] X Vcont where CONC = Containment Hydrogen Concentration in %.

Maximum Hydrogen volume that can be vented calculated to be 35424 ft^3

Comment:

Evaluator Cue: When candidate asks for Containment Hydrogen concentration, inform candidate that, "Containment Hydrogen concentration is 0%."

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___3__ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE Hydrogen flow rate (W) using Figure 8.

Standard:

Hydrogen flow rate determined to be 2900 scfm (+/-0)

Comment:

Evaluator Cue: When candidate asks for RCS pressure, inform candidate that, "RCS pressure is 1750 psig."

___4__ Performance step: **CRITICAL STEP** SAT/UNSAT

CALCULATE maximum venting time.

Standard:

Evaluator Note: This value is calculated by the formula: Tmax = Vmax/W No tolerance is given on this value as it uses values already determined and their allowable tolerance on those values does not change the result of this value out to the third decimal place.

Maximum RCS venting time calculated to be 12.215172 minutes (acceptable range is 12.2 to 12.4 minutes).

Comment:

Terminating cue: Candidate should inform the Unit 2 SS that, "maximum RCS venting time is 12.22 minutes)." At this point inform the cadidate that, "this JPM is complete."

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- The Control Room has been evacuated due to a fire.
- Both Units are being cooled down to Cold Shutdown in accordance with F5 Appendix B.
- Attachment M has been implemented for Unit 2 due to the presence of voids in the Reactor Vessel.
- RCS pressure is currently 1750 psig.

Initiating Cues:

The Unit 2 SS directs you to determine the maximum RCS venting time per F5 Appendix B, Attachment M, Page 3.

Attachment M Response to Control Room Fire Reactor Vessel Water Level Control

REACTOR VESSEL VENT TIME CALCULATION

INSTRUCTIONS FOR DETERMINING VENTING TIME

A. **DETERMINE** CONTAINMENT TEMPERATURE (T) IN DEGREES F. _____ °F

B. **CALCULATE** CONTAINMENT VOLUME AT STANDARD TEMPERATURE AND PRESSURE.

$Vcont = 1.32 \times 10^6 \times [492/(T + 460)]$

_____ ft^3

D. **DETERMINE** CONTAINMENT HYDROGEN CONCENTRATION (%). _____ CONC %

E. **CALCULATE** MAXIMUM HYDROGEN VOLUME THAT CAN BE VENTED.

$Vmax = [(3\% - CONC\%)/100\%] \times Vcont$

_____ Vmax

F. **DETERMINE** HYDROGEN FLOW RATE (W) USING Figure 8. _____ W

G. **CALCULATE** MAXIMUM VENTING TIME

$Tmax = Vmax/W$

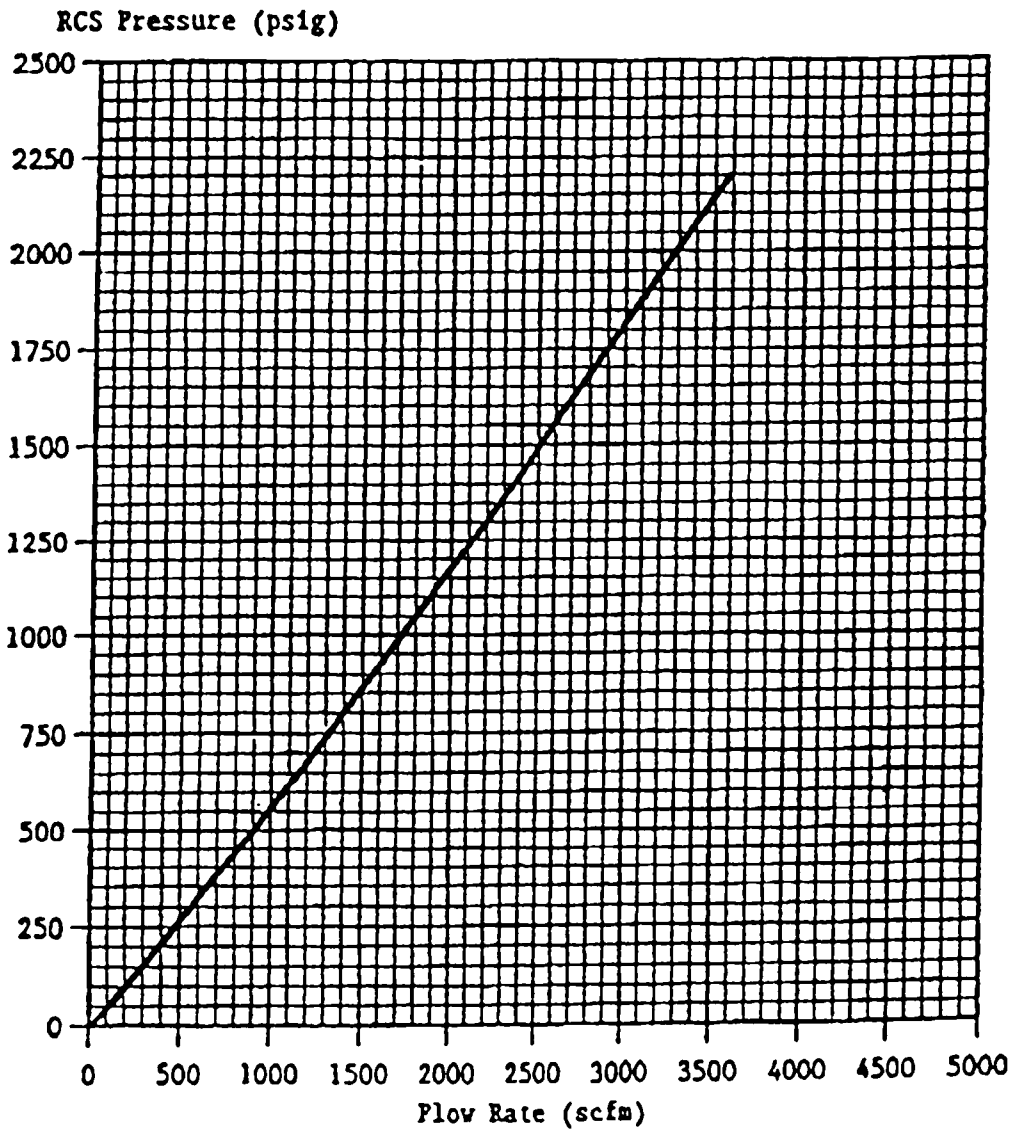
WHERE Tmax = THE MAXIMUM VENTING TIME.

Vmax = MAXIMUM HYDROGEN VOLUME THAT SHOULD BE VENTED AS CALCULATED IN STEP E.

W = HYDROGEN FLOWRATE AS CALCULATED IN STEP F.

_____ min

Figure 8 Hydrogen Flow Rate vs RCS Pressure



[redacted]

Facility: Prairie Island _____ Task No: _____

Task Title: Perform Alternate Calculation of RX Thermal Power

Job Performance Measure No: A.1.b

K/A Reference: 2.1.23 [3.9/4.0]

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance __ Actual Performance _X_ Classroom __ Simulator _X_ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is operating.
- NIS inputs into the "CALM" program are unavailable.
- SP-1005, " Unit 1 NIS Power Range Daily Calibration," is due.

Task Standard: Complete SP-1005B accurately.

Required Materials: Steam Tables, Calculator, Copy of SP-1005B

General References: SP-1005B

Initiating Cues:

- The SS has directed you to perform SP-1005B, "Unit 1 Alternate Calculation fo Reactor Thermal Power," using ERCS data at Panel F of the Main Control Board. The prerequisites of SP-1005B are complete. In order to save time only record Loop A data and assume Loop B data is identical to perform the calculations

Time Critical Task: YES/NO Alternate Path: YES/NO

Validation Time: __40_ Minutes Time Started _____ Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___1___ Performance step: **CRITICAL ~~TASK~~ Step #** SAT/UNSAT

First set of Calorimetric data is gathered and recorded in Table 1

Standard:

First set of data points are recorded onto Table 1. B Loop data is assumed to be the same as A Loop.

EVALUATOR NOTE: See Attached Key

Comment:

CUE: Computer point 1U2028A is unavailable. When data is taken tell examinee that 5 minutes has elapsed.

___2___ Performance step: **CRITICAL STEP** SAT/UNSAT

Second set of calorimetric data is gathered and recorded in Table 1.

Standard:

Second set of calorimetric data are recorded in Table 1. B Loop data is assumed to be the same as A Loop.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___3___ Performance step: **CRITICAL STEP** SAT/UNSAT

CALCULATE uncorrected % full power by completing the hand calculation in table 2 and correct for blowdown flow.

Standard:

Corrected % full power Calculated and recorded in table 2.

Comment:

CUE: None

Terminating cue: Actual full power is calculated per SP1005B Table 2.

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is operating.
- NIS inputs into the "CALM" program are unavailable.
- SP-1005, " Unit 1 NIS Power Range Daily Calibration," is due.

Initiating Cues:

- The SS has directed you to perform SP-1005B, "Unit 1 Alternate Calculation fo Reactor Thermal Power," using the ERCS terminal at Panel F.

- The prerequisites of SP-1005B are complete.

- In order to save time only record Loop A data and assume Loop B data is identical to perform the calculations

Table 1 Calorimetric Input Data

PARAMETER	SOURCE	FIRST SET	SECOND SET	AVERAGE
TIME	N/A			N/A
LOOP A				
11 Steam Generator Pressure (psig)	ERCS 1U2015A	709.4	709.4	709.4
11 Feedwater Temperature (°F)	ERCS 1U2011A	432.3	432.3	432.3
11 Feedwater Flow √in H_2O	ERCS 1F2511A	15.567	15,567	15.567
11 Steam Gen Blowdown Flow (gpm)	ERCS 1U2017A	59.1	59.1	59.1
LOOP B				
12 Steam Generator Pressure (psig)				
12 Feedwater Temperature (°F)				
12 Feedwater Flow √in H_2O				
12 Steam Gen Blowdown Flow (gpm)				

LOOP B SAME AS LOOP A

TO REDUCE CALCULATION TIME

KEY

KEY

Table 2 Hand Calculation Sheet

A. STEAM GENERATOR ENTHALPY CHANGE

		LOOP A	LOOP B
1.	Steam Pressure (psig)	709.4	704.4
	+14.7	+14.7	+14.7
	Steam Pressure (PSIA)	724.1	724.1
2.	Corresponding Enthalpy (h_g) BTU/lb (Use Steam Tables)	1201.27	1201.27
3.	Feedwater Temperature (°F)	432.3	432.3
4.	Corresponding Enthalpy (h_f) BTU/lb (Use Steam Tables)	410.44	410.44
5.	Enthalpy Difference (A2 - A4) BTU/lb	790.83	790.83

B. FEEDWATER FLOW

1.	Flow ($\sqrt{in}$ H_2O)	15.567	15.567
2.	F_a (from Figure 1)	1.0069	1.0069
3.	Flow Constant	0.03161	0.03174
4.	B1 (X) B2 (X) B3 =	.49547	.49751
5.	Feedwater Specific Volume @ Temp A3, (Use Steam Tables)	0.019345	0.019345
6.	$\sqrt{V_f} = \sqrt{B5}$		
7.	m(feedflow in 10^6 lb/hr) = (B4) + (B6)	3.582	3.582

KEY

KEY

Table 2 Hand Calculation Sheet

C. POWER

	LOOP A		LOOP B
1. A5 (X) B7 = Loop Thermal Power	6932.15		2232.75
2. Loop A (+) Loop B = Total Thermal Power		9165.5	
Minus 24 (RCP thermal input)		-24.0	
3. Total Thermal Power in 10^6 BTU\hr		5641.5	
(X) 0.2929		X 0.2929	
4. Total Thermal Power in Megawatts		1652.3454	
(X) 0.06061		X0.06061	
5. % Full Power (uncorrected for steam generator blowdown)		100.15	

FP = Full Power corrected for SG blowdown

FPuc = Full Power uncorrected for blowdown

SGA = SG "A" Blowdown Flow in gpm

SGB = SG "B" Blowdown Flow in gpm

$$FP = (FPuc) - \left[\frac{(SGA + SGB) - 20}{200}\right]$$

$$FP = (100.15) - \left[\frac{(59.1 + 59.1) - 20}{200}\right]$$

* 6. FP = 99.66 % Full Power

KEY

ALTERNATE CALCULATION OF REACTOR THERMAL POWER

NUMBER: SP 1005B
REV: 11

SYSTEM(S): FW, MS, SB

WO: _____

RESULTS/COMMENTS:

Work Order Initiated: YES _____ NO _____ WO No. _____

Test Performance:

Performed By: _____ Date: _____
(Signature or Initials)

Additional Requirements:

NONE

Review of Acceptability:
Acceptance Criteria Met? YES/NO Shift Supervisor: _____

SP Completion:
Shift Supervisor: _____ Date: _____

SP Surveillance Schedule Satisfied. YES/NO Surv. Admin: _____

Other Actions for Consideration:

Nuclear Engineer Review: _____ Date: _____

O.C. REVIEW DATE:	OWNER:	EFFECTIVE DATE
7/3/02	J. Kapitz	7/3/02

1.0 PURPOSE AND GENERAL DISCUSSION

CONTINUOUS USE

- ***Continuous use of procedure required.***
- ***Read each step prior to performing.***
- ***Mark off steps as they are completed.***
- ***Procedure SHALL be at the work location.***

1.1 Purpose

1.1.1 This surveillance procedure provides an alternate method of calculating reactor thermal power when the ERCS calorimetric program (CALM) is not available.

1.1.2 Reactor thermal power is determined by a secondary plant thermodynamic calculation.

1.2 Acceptance Criteria

1.2.1 General

In the event Acceptance Criteria cannot be met, refer to Ops. Manual Section G "Surveillance And Periodic Test Program" for additional guidance.

1.2.2 Procedure Completion

This SP is acceptable when Table 2 has been completed resulting in a reactor power level determination.

1.3 General Discussion

1.3.1 Steps in this procedure that are not Acceptance Criteria (not asterisked) are to be observed and inconsistencies noted. If there are significant deviations or questions as to the operability, contact the Shift Supervisor or System Engineer for guidance.

1.3.2 Parameters outside the Minimum or Maximum require immediate contact with the Shift Supervisor. In some cases, this may require prompt action to prevent equipment damage. Consideration should be given to aborting the procedure.

1.3.3 Every step identified by an asterisk (*) must be acceptable for this test to be acceptable. IF any acceptance step is not met, THEN the Shift Supervisor **SHALL** be notified immediately.

1.3.4 Several steps of this procedure may be performed by operations personnel outside of the Control Room, with these steps identified by a "pound sign" (#).

2.0 REFERENCES

2.1 SP 1005, NIS Power Range Daily Calibration

2.2 Tech Spec: T.S.4.1, Operational Safety Review ([redacted])

2.3 Project 81Y181R, 87Y785, Modification Documentation

2.4 Flow Diagrams:

- NF-39218, Main Auxiliary Steam & Steam Dump
- NF-39222, Feedwater System Unit 1
- NF-88740, Steam Generator Blowdown System Units 1 & 2

2.5 Implementing Reference(s)

C21.1.2, PROGRAMMABLE CONTROLLER SYSTEM

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Do not use invalid or rejected ERCS points.

3.2 If instrument accuracy is in question, verify instrument accuracy with I&C.

4.0 PERSONNEL AND SPECIAL EQUIPMENT REQUIREMENTS

4.1 Suggested Personnel

4.1.1 One (1) Control Room Operator - to record data and make calculations.

4.1.2 One (1) Outplant Operator - to take data.

4.1.3 One (1) Instrumentation & Control Technician - to take data.

4.2 Special Equipment

Calibrated Digital Volt Meter (DVM)

PI Number _____ Calibration Due Date: _____

5.0 SPECIAL CONSIDERATIONS

NONE

6.0 PREREQUISITES AND INITIAL CONDITIONS

6.1 Power greater than 15% rated thermal power. _____

6.2 $T_{AVG} = T_{REF}$ ±0.5°F except in coastdown operations per C1.4. _____

6.3 Power as measured by NIS is stable, ±1%. _____

6.4 SG level is on program ±4%. _____

7.0 PROCEDURE

7.1 **Record** the Parameter sources and values for the FIRST SET of data in Table 1. **N/A** portions of table that are not used. _____

NOTE	**Each calorimetric parameter has several potential sources for the required data. Parameter sources are sequentially listed by preference, but the Shift Supervisor may select any of the listed sources. Record the selected data in Table 1. The data points not used should be marked NA.**

NOTE	**ERCS Turn-On-Code (TOC) GRPDIS, Group (SP1005B), may be used to obtain values for some of the ERCS points.**

7.2 Steam Generator Pressure

7.2.1 11 Steam Generator

A. ERCS: _____

1U2015A, STEAM GENERATOR A AVERAGE PRESS

1P0400A, LOOP A STM GEN PRESS 468

1P0401A, LOOP A STM GEN PRESS 469

1P0402A, LOOP A STM GEN PRESS 482

B. Main Control Board Pressure Recorder 1PR-468 (42068): _____

CH1: 1P-468

CH2: 1P-469

CH3: 1P-482

C. Main Control Board Pressure Indicators: _____

1PI-468 (4113701)

1PI-469 (4113702)

1PI-482A (4113703)

D. HSD panel (51000) Pressure Indication: _____

1PI-482B (11710), STM GEN MN STM HDR PI

7.2.2 12 Steam Generator

A. ERCS: _____

1U2016A, STEAM GENERATOR B AVERAGE PRESS

1P0420A, LOOP B STM GEN PRESS 478

1P0421A, LOOP B STM GEN PRESS 479

1P0422A, LOOP B STM GEN PRESS 483

B. Main Control Board Pressure Recorder: _____

1PR-478 (42069)

CH1: 1P-478

CH2: 1P-479

CH3: 1P-483

C. Main Control Board Pressure Indicators: _____

1PI-478 (4113801)

1PI-479 (4113802)

1PI-483A (4113803)

D. HSD panel (51000) Pressure Indication: _____

1PI-483B (11711), STM GEN MN STM HDR PI

7.3 Feedwater Temperature

NOTE	I&C personnel support will be required for data retrieval.

7.3.1 11 SG FW Inlet Temperature

A. ERCS:

1T0418A, LOOP A STM GEN FW TEMP

1U2011A, STEAM GENERATOR A FEEDWATER TEMP

B. **Send** I&C Tech to retrieve Digital Volt Meter (DVM) test point data from 1FW rack (TP/TQ498 LOOP A FW TEMP) and report the data to Operations.

Convert DVM data to temperature using the following calculation:

$$\text{Temperature (°F)} = \frac{(\text{DVM data} - 0.1)}{0.4} \times 500°F$$

		DVM	°F
First Set	Loop A	_____	_____
Second Set	Loop A	_____	_____

NOTE	**I&C Engineering SHOULD be contacted prior to using the common RTD reading. The accuracy of this reading may need engineering review.**

C. **Request** I&C obtain the common FW Line Temperature from RTD-TE-15255, 11/12 SG FW Hdr RTD.

NOTE **I&C personnel support will be required for data retrieval.**

7.3.2 12 SG FW Inlet Temperature

A. ERCS: _____

1T0438A, LOOP B STM GEN FW TEMP

1U2012A, STEAM GENERATOR B FEEDWATER TEMP

B. **Send** I&C Tech to retrieve Digital Volt Meter (DVM) test point data from 1FW rack (TP/TQ499 LOOP B FW TEMP) and report the data to Operations. _____

Convert DVM data to temperature using the following calculation:

$$\text{Temperature (°F)} = \frac{(\text{DVM data} - 0.1)}{0.4} \times 500°F$$

		DVM	°F
First Set	Loop B	_____	_____
Second Set	Loop B	_____	_____

NOTE **I&C Engineering SHOULD be contacted prior to using the common RTD reading. The accuracy of this reading may need engineering review.**

C. **Request** I&C obtain the common FW Line Temperature from RTD-TE-15255, 11/12 SG FW Hdr RTD. _____

7.4 Feedwater Flow

NOTE Variance in Feedwater Flow has the greatest effect on calorimetric Reactor Thermal Power.

7.4.1 11 SG Feedwater Flow

A. ERCS: _____

NOTE If 1U2028A is used, insert this value directly in Table 2 at step B7 and NA steps B1 thru B6 of Table 2.

1. 1U2028A (MLB/HR)
2. 1F2511A (SQRTIN)
3. 1AFWAV (SQRTIN) - 5 minute average

B. **Notify** I&C to retrieve DVM test point data from 1FW rack (TP/FQ495 LOOP A FW FLOW) and report the data to Operations. _____

Record DVM readings, then convert to square-root-extracted inches of water for use in the calculation.

$$\sqrt{IN}\ H_2O = \frac{(\text{DVM reading} - 0.1)}{0.4} x\, 19.35 \sqrt{IN}\ H_2O$$

		DVM	Flow
First Set	Loop A	_____	_____
Second Set	Loop A	_____	_____

NOTE **IF the feedwater flow transmitter is not available, THEN complete Step 7.4.1.C Other times, this step may be NA'ed.**

C. **Notify** I&C to install a calibrated DP Barton indicator (connect Barton at tap set 2 for Loop A) that reads in inches of water and report the data to Operations. _____

7.4.2 12 SG Feedwater Flow

A. ERCS: _____

NOTE	If 1U2029A is used, insert this value directly in Table 2 at step B7 and N/A steps B1 thru B6 of Table 2.

1. 1U2029A (MLB/HR)
2. 1F2512A (SQRTIN)
3. 1BFWAV (SQRTIN) - 5 minute average

B. **Notify** I&C to retrieve DVM test point data from 1FW rack (TP/FQ497 LOOP B FW FLOW) and report the data to Operations. _____

Record DVM readings, then convert to square-root-extracted inches of water for use in the calculation.

$$\sqrt{IN}\ H_2O = \frac{(\text{DVM reading} - 0.1)}{0.4} \times 19.28\ \sqrt{IN}\ H_2O$$

		DVM	Flow
First Set	Loop B	_____	_____
Second Set	Loop B	_____	_____

NOTE	IF the feedwater flow transmitter is not available, THEN complete step 7.4.2. C. Other times, this step may be N/A'ed.

C. **Notify** I&C to install a calibrated DP Barton indicator (connect Barton at tap set 1 for Loop B) that reads in inches of water and report the data to Operations. _____

7.5 Steam Generator Blowdown Flow

For Graphic Display - Notify Aux Building Operator to retrieve SG Blowdown Flow using the 1SGB Program in the Programmable Controller System (PCS) per C21.1.2.

7.5.1 11 SGB Flow

A. ERCS - 1U2017A, STEAM GENERATOR A BLOWDOWN FLOW. _____

B. Panel 58350, SGB; WL; ARTD SYSTEMS GRAPHIC DISPLAY SYSTEM. _____

C. Local Flow Indication - FI-58101, 11 SGB FI. _____

7.5.2 12 SGB Flow

A. ERCS - 1U2018A, STEAM GENERATOR B BLOWDOWN FLOW. _____

B. Panel 58350, SGB; WL; ARTD SYSTEMS GRAPHIC DISPLAY SYSTEM. _____

C. Local Flow Indication - FI-58102, 12 SGB FI. _____

7.6 Five (5) minutes after the initial data was recorded, using the same sources as identified in Step 7.1, record the SECOND SET of data in Table 1. _____

7.7 Complete the Average column. _____

7.8 Use Table 1 Average Data and calculate the % full power by completing Table 2. _____

7.9 If this procedure (SP 1005B) was initiated by SP 1005, **record** the calculated percent reactor thermal power as the Average Reactor Thermal Power in Table 1 of SP 1005. Otherwise, this step is **N/A**'ed. _____

7.10 Attach this SP (SP 1005B) to the initiating procedure. _____

8.0 ADDITIONAL REQUIREMENTS

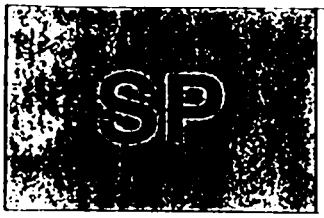
NONE

9.0 ATTACHMENTS

9.1 Table 1 - Calorimetric Input Data

9.2 Table 2 - Hand Calculation Sheet.

9.3 Figure 1 - Thermal Expansion Factor 304 Stainless Steel Nozzles.



ALTERNATE CALCULATION OF REACTOR THERMAL POWER

Table 1 Calorimetric Input Data

PARAMETER	SOURCE	FIRST SET	SECOND SET	AVERAGE
TIME	N/A			N/A
LOOP A				
11 Steam Generator Pressure (psig)				
11 Feedwater Temperature (°F)				
11 Feedwater Flow √in H_2O				
11 Steam Gen Blowdown Flow (gpm)				
LOOP B				
12 Steam Generator Pressure (psig)				
12 Feedwater Temperature (°F)				
12 Feedwater Flow √in H_2O				
12 Steam Gen Blowdown Flow (gpm)				

Table 2 Hand Calculation Sheet

A. STEAM GENERATOR ENTHALPY CHANGE

		LOOP A	LOOP B
1.	Steam Pressure (psig)		
	+14.7	+14.7	+14.7
	Steam Pressure (PSIA)		
2.	Corresponding Enthalpy (h_g) BTU/lb (Use Steam Tables)		
3.	Feedwater Temperature (°F)		
4.	Corresponding Enthalpy (h_f) BTU/lb (Use Steam Tables)		
5.	Enthalpy Difference (A2 - A4) BTU/lb		

B. FEEDWATER FLOW

1.	Flow ($\sqrt{in}$ H_2O)		
2.	F_a (from Figure 1)		
3.	Flow Constant	0.03161	0.03174
4.	B1 (X) B2 (X) B3 =		
5.	Feedwater Specific Volume @ Temp A3, (Use Steam Tables)		
6.	$\sqrt{V_f} = \sqrt{B5}$		
7.	m(feedflow in 10^6 lb/hr) = (B4) + (B6)		

Table 2 Hand Calculation Sheet

C. POWER

	LOOP A		LOOP B
1. A5 (X) B7 = Loop Thermal Power			
2. Loop A (+) Loop B = Total Thermal Power			
Minus 24 (RCP thermal input)		-24.0	
3. Total Thermal Power in 10^6 BTU\hr			
(X) 0.2929		X 0.2929	
4. Total Thermal Power in Megawatts			
(X) 0.06061		X0.06061	
5. % Full Power (uncorrected for steam generator blowdown)			

FP = Full Power corrected for SG blowdown

FPuc = Full Power uncorrected for blowdown

SGA = SG "A" Blowdown Flow in gpm

SGB = SG "B" Blowdown Flow in gpm

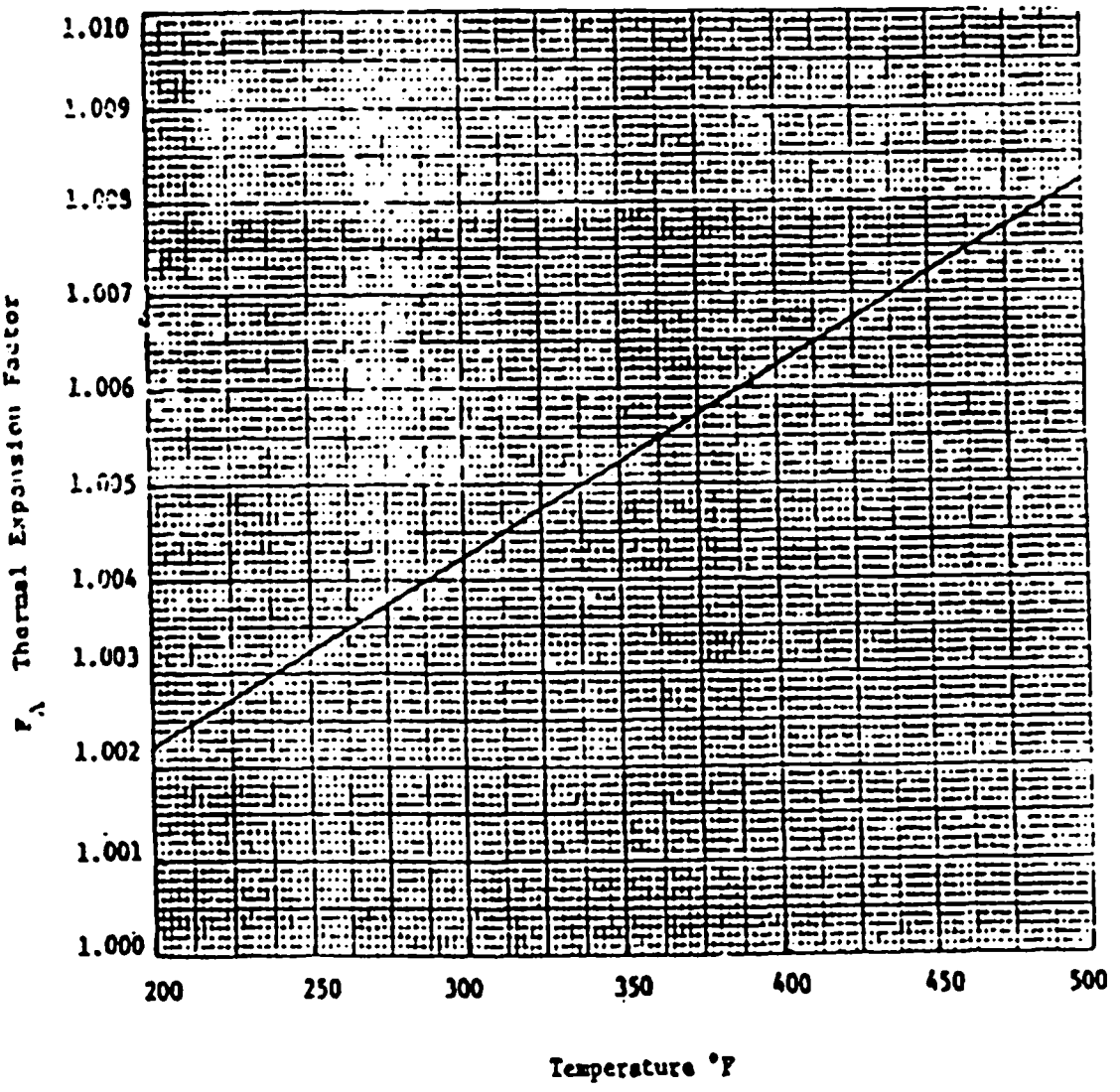
$$FP = (FPuc) - \left[\frac{(SGA + SGB) - 20}{200}\right]$$

$$FP = (\_\_\_\_\_) - \left[\frac{(\_\_\_\_ + \_\_\_\_) - 20}{200}\right]$$

* 6. % Full Power (corrected for steam gen. blowdown)

FP = _____% Full Power

Figure 1 Thermal Expansion Factor 304 Stainless Steel Nozzles



Abstracted from Nozzle Vendors Manual W-1014, Section 9.

JPM A.2 SRO

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Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Perform Risk Assessment for 11 TD AFW Pump Emergent Work and Determine if Emergent Work Will Be Allowed to Proceed

Job Performance Measure No: SRO A.2

K/A Reference: 2.2.17 [3.5]

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:
Simulated Performance _X_ Actual Performance __ Classroom _X_ Simulator __ Plant __

READ TO THE EXAMINEE
I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 100 % power
- The following equipment is OOS:
  - Diesel Generator D2
  - 12 Charging Pump
  - 12 MD Auxiliary Feedwater Pump
- Unit 2 is at 100% power, NO Tech Spec LCOs in effect

Task Standard:
1. PERFORM a Risk Assessment using the EOOS program.
2. RECOGNIZE that the Risk Assessment will NOT allow the 11 TD AFWP to be taken OOS 1) without management approval, and 2) taking actions to either place equipment back in service or implementing contingency actions.

Required Materials:
1. Access to EOOS program to perform Risk Assessment
2. H24.1, "Assessment and Management of Risk Associated with Maintenance Activities"

General References:
1. H24.1, "Assessment and Management of Risk Associated with Maintenance Activities"
2. 5AWI 15.0.0, "Work Control Process", Step 6.5.13

Initiating Cues:

- You are the Unit 1 Shift Supervisor.
- The Shift Manager has given you an emergent Work Order on the 11 TD AFWP.
- You have been directed by the Shift Manager to perform a Risk Assessment while he looks at Tech Spec applicability.

Time Critical Task: YES/NO | Alternate Path: YES/NO

Validation Time: 15 Minutes | Time Started _____ | Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__1__ Performance step: **CRITICAL STEP** SAT/UNSAT

ENTER the EOOS Risk Assessment program per the following:

- **Start**
- **Applications**
- **EOOS 2.6**
- **User Name**
- **Password**

Standard:

ENTERS the EOOS Risk Assessment program.

Comment:

CUES:
- **IF asked, the User Name is "PI".**
- **IF asked, the Password is "User".**

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__2__ Performance step: **CRITICAL STEP** SAT/UNSAT

ENTER the following equipment OOS in the EOOS program:

- **Diesel Generator D2**
- **12 Charging Pump**
- **12 MD AFWP**
- **11 TD AFWP**

Standard:

ENTERS the following equipment OOS in the EOOS program:

- **Diesel Generator D2**
- **12 Charging Pump**
- **12 MD AFWP**
- **11 TD AFWP**

Comment:

CUE: **WHEN get to a screen that gives the option of "No Log Entry" or "OK", state to always click on "No Log Entry".**

CUES: **IF asked, the CHAMPS Equipment ID numbers are:**

- **For D2, "034-021"**
- **For 12 Charging Pump, "145-042"**
- **For 12 MD AFWP, "145-331"**
- **For 11 TD AFWP, "145-201"**

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

3 Performance step: **CRITICAL STEP** SAT/UNSAT

PERFORM a calculation of the Risk Assessment for the OOS of Diesel Generator D2, 12 Charging Pump, 12 MD AFWP, and the 11 TD AFWP using the EOOS program.

STATE that voluntary entry into a RED risk category (for taking the 11 TD AFWP OOS) is NOT allowed (without further reviews/risk considerations).

Standard:

DETERMINES the following from the Risk Assessment using the EOOS program:

- **Core Damage Frequency (CDF) is 2.00E-3**
- **Risk Rate Color Category is RED**
- **Allowable Outage Time (AOT) is 4.4 hours**

STATES that voluntary entry into a RED risk category (for taking the 11 TD AFWP OOS) is NOT allowed (without further reviews/risk considerations).

Comment:

FOLLOWUP QUESTION:
Based (solely) on the Risk Assessment, ask whether he would allow the 11 TD AFWP to be taken OOS.

EVALUATOR NOTE:
IF Tech Spec issue is mentioned (TS 3.0.C would apply with both AFWPs being OOS, requiring a Reactor shutdown to be initiated within one (1) hour), state that you understand that there is a Tech Spec issue, but that the Tech Spec issue is being addressed by the Shift Manager. State that you want to know whether he would allow the 11 TD AFWP to be taken OOS based (solely) on the Risk Assessment.

CUES:
- **WHEN applicant states that 11 TD AFWP can NOT be taken OOS based on the RED risk assessment, state the following:**
  - **This is the Shift Manager. We need to take the 11 TD AFWP OOS. There is excessive water in the oil. What actions would you have to take to allow us to enter a RED risk category and perform the required work.**
- **IF asked, state it will take 30 minutes to change the oil on the 11 TD AFWP.**

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___3___ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE the following requirements before entering a RED risk category:

- **Operations Committee must authorize operation for any length of time in a RED condition.**
- **Immediately take steps to place equipment back in service or implement pre-planned contingency actions (Risk Management Actions) to restore at least an ORANGE risk color category.**

Standard:

DETERMINES the following requirements before entering a RED risk category (from H24.1, "Assessment and Management of Risk Associated with Maintenance Activities", steps 4.20 and 6.4.7):

- **Operations Committee must authorize operation for any length of time in a RED condition.**
- **Immediately take steps to place equipment back in service or implement pre-planned contingency actions (Risk Management Actions) to restore at least an ORANGE risk color category.**

Comment:

Terminating cue:

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is at 100 % power
- The following equipment is OOS:
  - Diesel Generator D2
  - 12 Charging Pump
  - 12 MD Auxiliary Feedwater Pump
- Unit 2 is at 100% power, NO Tech Spec LCOs in effect

Initiating Cues:

- You are the Unit 1 Shift Supervisor.
- The Shift Manager has given you an emergent Work Order on the 11 TD AFWP.
- You have been directed by the Shift Manager to perform a Risk Assessment while he looks at Tech Spec applicability.

JPM A.2 RO

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Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Prepare an Isolation for 11 TD AFW Pump | Job Performance Measure No: RO A.2

K/A Reference: 2.2.13, 2.1.24 [3.1/3.3, 2.8/3.1]

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:
Simulated Performance _X_ Actual Performance __ Classroom _X_ Simulator __ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 100 % power
- While running the 11 TD AFWP for surveillance, a steam leak developed on the turbine casing for the pump, and there was excessive water leakage on the inboard pump seal
- The 11 TD AFWP was just shutdown and declared inoperable

Task Standard: IDENTIFY the valves required to mechanically isolate both the steam side and the water side of the 11 TD AFWP.

Required Materials: Flow Diagrams: NF-39216-2, NF-39218, and NF-39222

General References:
1. Flow Diagrams: NF-39216-2, NF-39218, and NF-39222
2. B Section Figures B27-01, B28B-1, and B28B-2
3. C28-2, "Auxiliary Feedwater System Unit 1"

Initiating Cues:

- The Shift Supervisor directs you to IDENTIFY the valves and their positions required to **mechanically isolate** the 11 TD AFWP. **Include normally closed valves**.
- DOCUMENT using the form provided.
- CHAMPS is NOT available.
- A tag section per 5AWI 15.5.1, "Plant Equipment Control and Clearance Process" will be performed **at a later time** through Work Control which will include an electrical isolation and draining/venting of the 11 TD AFWP.
- At the present time the Shift Supervisor just needs you to IDENTIFY the valves and their positions required to provide a **mechanical isolation boundary** for the 11 TD AFWP. These valves will **later** be put on the tag section to be written for the pump.

Time Critical Task: YES/NO | Alternate Path: YES/NO

Validation Time: 15 Minutes | Time Started _____ | Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__1__ Performance step: **CRITICAL STEP** SAT/UNSAT

IDENTIFY steam supply to the 11 TD AFWP is to be isolated.

Standard:

IDENTIFY steam supply to the 11 TD AFWP is to be isolated by documenting the following on the form provided:

CLOSE MV-32016, "11 MAIN STM TO 11 TD AFWP" using control switch CS-46127
CLOSE MV-32017, "12 MAIN STM TO 11 TD AFWP" using control switch CS-46128
OR
Locally TRIP CLOSED the overspeed trip valve CV-31059, "TRIP / THROTTLE VALVE TO 11 TD AFWP"

Comment:

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__2__ Performance step: **CRITICAL STEP** SAT/UNSAT

IDENTIFY discharge of the 11 TD AFWP is to be isolated.

Standard:

IDENTIFY discharge of the 11 TD AFWP is to be isolated by documenting the following on the form provided:

Locally CLOSE the 11 TD AFWP manual discharge valve AF-13-3 "11 AFWP DISCHARGE"
OR
CLOSE MV-32238, "11 TD AFWP TO 11 STM GEN" using control switch CS-46314
CLOSE MV-32239, "11 TD AFWP TO 12 STM GEN" using control switch CS-46315
Locally CLOSE AF-17-1 "11 AFWP TEST LINE ISOLATION"
Locally CLOSE AF-18-1 "11 AFWP RECIRC / LUBE OIL COOLING"

EVALUATOR NOTES:

- **There is some latitude allowed, in that other arrangements of valves may be selected and closed and still accomplish the required mechanical isolation of the discharge the 11 TD AFWP**
- **Other selection of valves to accomplish the required isolation of the discharge of the 11 TD AFWP must be evaluated on a case-by-case basis**

Comment:

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

3 Performance step: **CRITICAL STEP** SAT/UNSAT

IDENTIFY suction of the 11 TD AFWP is to be isolated.

Standard:

IDENTIFY suction of the 11 TD AFWP is to be isolated by documenting the following on the form provided:

CLOSE MV-32333, "COND TO 11 TD AFWP SUCT" using control switch CS-46420
AND
VERIFY CLOSED MV-32025, "CLG WTR TO 11 TD AFWP SUCT" using control switch CS-46433
OR
CLOSE CL-113-1, "CLG WTR ISOLATION TO 11 AFWP"

Comment:

Terminating cue:

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

ISOLATION FOR THE 11 TD AFWP

Component ID	Component Description	Isolation Status
MV-32016*	11 MAIN STM TO 11 TD AFWP MV-32016	CLOSED
MV-32017*	12 MAIN STM TO 11 TD AFWP MV-32017	CLOSED
CV-31059**	TRIP / THROTTLE VALVE TO 11 TD AFWP	CLOSED/TRIPPED
AF-13-3+	11 AFWP DISCHARGE	CLOSED
MV-32238++	11 TD AFWP TO 11 STM GEN MV-32238	CLOSED
MV-32239++	11 TD AFWP TO 12 STM GEN MV-32239	CLOSED
AF-17-1++	11 AFWP TEST LINE ISOLATION	CLOSED
AF-18-1++	11 AFWP RECIRC / LUBE OIL COOLING	CLOSED
MV-32333	COND TO 11 TD AFWP SUCT MV-32333	CLOSED
MV-32025#	CLG WTR TO 11 TD AFWP SUCT MV-32025	CLOSED
CL-113-1##	CLG WTR ISOLATION TO 11 AFWP	CLOSED

EVALUATOR NOTES:

- **Either the valves identified by an asterisk (*) OR the valves identified by a double asterisk (**) must be closed**
- **Either the valves identified by a plus (+) OR the valves identified by a double plus (++) must be closed**
- **Either the valve identified by a pound sign (#) OR the valve identified by a double pound sign (##) must be closed**
- **There is some latitude allowed, in that other arrangements of valves may be selected and closed and still accomplish the required mechanical isolation of the steam side and the water side of the 11 TD AFWP**
- **Other selection of valves to accomplish the required isolation of the 11 TD AFWP must be evaluated on a case-by-case basis**

Initial Conditions:

- **Unit 1 is at 100 % power**
- **While running the 11 TD AFWP for surveillance, a steam leak developed on the turbine casing for the pump, and there was excessive water leakage on the inboard pump seal**
- **The 11 TD AFWP was just shutdown and declared inoperable**

Initiating Cues:

- **The Shift Supervisor directs you to IDENTIFY the valves and their positions required to mechanically isolate the 11 TD AFWP. Include normally closed valves.**
- **DOCUMENT using the form provided.**
- **CHAMPS is NOT available.**
- **A tag section per 5AWI 15.5.1, "Plant Equipment Control and Clearance Process" will be performed at a later time through Work Control which will include an electrical isolation and draining/venting of the 11 TD AFWP.**
- **At the present time the Shift Supervisor just needs you to IDENTIFY the valves and their positions required to provide a mechanical isolation boundary for the 11 TD AFWP. These valves will later be put on the tag section to be written for the pump.**

ISOLATION FOR THE 11 TD AFWP

Component ID	Component Description	Isolation Status

RO JPM 7.3

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Preparations for emergency containment entry | Job Performance Measure No: ROA.3

K/A Reference: 2.3.10 [2.9/3.3]

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance _X_ Actual Performance __ Classroom _X_ Simulator __ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is at 25% and increasing power.
- A 2.0 gpm RCS leak has been detected during the performance of the daily leak rate surveillance.
- It is suspected that RC-1-1 and RC-1-2 are leaking by their seats into the RCDT
- R-11 and R-12 are alarming on-scale.
- A team is being assembled to enter containment to perform an inspection to attempt to locate and isolate the leak (located in A Loop RCP vault).
- Containment Wet bulb temperature is 92° F.

Task Standard: All critical steps and at least 8 of the 10 requirements listed on the key identified for an emergency containment entry with R-11 and R-12 alarming on scale.

Required Materials: F-2, "Radiation Safety," Rev.22.

General References: F-2, "Radiation Safety," Rev.22.

Initiating Cues:

- The SM has directed you to prepare for an emergency containment entry per F-2.
- You are to **list** all restrictions, requirements, and actions that must be met prior to containment entry.

Time Critical Task: YES/NO | Alternate Path: YES/NO

Validation Time: __20_ Minutes | Time Started _____ | Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

____1__ Performance step: **Critical Step** SAT/UNSAT

F-2, "Radiation Safety," Rev.22. Step 9.1.2, "Containment entry is NOT permitted during reactor startup or during reactivity changes while the reactor is critical.

Standard:

Candidate finds and reads F-2, "Radiation Safety," Rev.22, and determines that the power increase must stop.

Comment:

CUE: If asked provide the candidate a copy of F-2, "Radiation Safety," Rev.22.

____2_ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22. Step 9.3.2

Standard:

Candidate finds and reads F-2, "Radiation Safety," Rev.22. Step 9.3.2, "Emergency Entry is defined as non-routine entry for inspection or operation such as a fire alarm or limit switch position check."

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___3_ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev.22. Step 9.2

Specific requirements for containment entry while at hot standby and power are spelled out in these procedures.

F-2, "Radiation Safety," Rev.22. Step 9.2.1, The entry team SHALL be equipped with dosimeters, TLD's, and a beta-gamma survey instrument.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None

___4__ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.2, Entry into the RC loops and Reactor Cavity SHALL NOT be permitted without permission from the superintendent of Radiation Protection and Chemistry or his designee.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___5___ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.3, Prior to containment entry, contact the Shift Supervisor to confirm the following:

A. There is not flux mapping or incore detector movement in progress. Very high radiation dose rates and possible overexposures can be caused by the incore detectors.
B. The Shield buiding ventilation systems are secured.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

___6_ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.4, If the unit is above cold shutdown, one shield building door at each entry **SHALL** be closed at all times.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___7___ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.5, Before entry, a pre-job briefing SHALL be conducted with those entering and Control Room personnel, as appropriate. This pre-job briefing SHALL include a discussion of all tour/work locations and anticipated radiation levels (PINGP 1112)

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

___8___ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.6, All personnel entering the containment SHALL check in with the Control Room, or the designated person at the airlock, if posted.

When contacting Control Room prior to Containment entry at power, ensure all, personnel are wearing a TLD and Electronic Dosimeter (ED) and the ED is turned on (number and mRem indicated with the window).

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___9___ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.2.7, All personnel should use discretion when temperatures are above 85 degrees. The guidelines for heat stress in the NSP PINGP Safety Manual should be reviewed. Backup teams and stay times may be required.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: If asked inform the candidate that containment temperature is 92°.

___10___ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.3.2, B. If R-11 and R-12 of the appropriate Unit are:

1. Not alarming and normal readings, entry may be made without any respiratory protection.

2. **Alarming on scale, entry may be made with the use of a MSA Ultralite II.**

3. Alarming off scale, no entry may be made without the Supt. Rad Protection or designee appraisal and approval.

Standard:

Candidate determines that this requirement (2) applies and documents by listing on the sheet provided.

Comment:

CUE: If asked inform the candidate that R11 and R 12 are alarming **ON** scale.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__11__ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.3.2.C, observe the requirements of the Radiation Work Permit.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

Terminating cue: When the candidate determines that all F-2 requirements are listed.

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is at 25% and increasing power.
- A 2.0 gpm RCS leak has been detected during the performance of the daily leak rate surveillance.
- It is suspected that RC-1-1 and RC-1-2 are leaking by their seats into the RCDT.
- R-11 and R-12 are alarming on-scale.
- A team is being assembled to enter containment to perform an inspection to attempt to locate and isolate the leak (located in A Loop RCP vault).
- Containment wet bulb temperature is 92° F.

Initiating Cues:

- The SM has directed you to prepare for an emergency containment entry per **F-2**.
- You are to **list** all restrictions, requirements, and actions that must be met prior to containment entry.

Requirements

KEY

Requirements
1. Stop Power Increase
2. Entry team equipped with TLD's, Dosimeters, and a beta-gamma survey instrument.
3. Need permission of Supt. of Radiation Protection and Chemistry to enter RC loop area
4. Contact SS and verify that no flux mapping or incore detector movement is in progress and that shield building ventilation is secured.
5. If in Mode 1 then one shield building door at each entrance must be closed.
6. Pre-job brief
7. Check in w/control room and verify TLD & ED is on
8. When containment temperatures are above 85° review guidelines in safety manual.
9. MSA Ultralite II required for entry
10. Follow RWP requirements.

Key

F2	RADIATION SAFETY	NUMBER: F2
		REV: 22

INFORMATION USE

- *Procedure may be performed from memory.*
- *User remains responsible for procedure adherence.*
- *Procedure should be available, but not necessarily at, the work location.*

F2	RADIATION SAFETY	NUMBER: F2
		REV: 22

TABLE OF CONTENTS

1.0 ALARA

1.1 General Discussion

The objective for all Radiation Safety practices at Prairie Island is to keep radiation exposures to plant workers and the general public "As Low as Reasonably Achievable" - ALARA. The ALARA goals are (1) to maintain the annual dose to individual employees as low as reasonably achievable and (2) to keep the annual integrated dose for all station workers as low as reasonably achievable (i.e., total station Person-REM ALARA). All personnel on site **SHALL** be responsible for ALARA. The design and operation of the ISFSI (Independent Spent Fuel Storage Installation) **SHALL** fall under the plant's ALARA program. The details of the ALARA Program are contained in Radiation Protection Implementing Procedure, RPIP-1004.

The Management of Prairie Island and NMC are and have been committed to safety and ALARA. ALARA is now required by 10CFR20.1101(b): "The licensee **SHALL** use to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." Therefore, all plant personnel should continually look at means to maintain radiation exposure ALARA.

1.2 Radiation Sources

There are two main sources of radiation to personnel at Prairie Island. The largest source of radiation is from the activation of corrosion products. Corrosion products are formed in the Reactor Coolant System and activated when they pass through or are deposited in the reactor core neutron field. The major source term for dose from corrosion products is the isotope Cobalt-60. Cobalt materials are typically used where hard wear surfaces are desired. Any wear or corrosion of these surfaces will result in the release of the cobalt material which will become activated in the reactor and later settle on out of core surfaces. The corrosion products will be deposited in low flow areas or crevices; such as, drain valves, instrument tap-offs, in the gap in socket welds, and pipes with low flow section.

The other largest contributor to radiation fields is the fission products that are formed when the nuclear fuel fissions. These fissions products leak from the fuel into the Reactor Coolant System and are transported about the plant systems.

1.3 Plant Operations to Minimize Doses

Below is a listing of practices that are used to minimize the transport of corrosion products from the fuel to ex-core areas and limit the resulting doses to plant personnel.

1.3.1 The Reactor Coolant System is operated with dissolved hydrogen in the water which helps maintain a slightly basic, reducing chemistry environment.

1.3.2 The oxygen levels in the Reactor Makeup Water Systems are minimized.

1.3.3 Purification of the RCS is maximized during outages, shutdowns, and startups. Resin choices are optimized during outage and non-outage times to ensure the best practical cleanup efficiency.

1.3.4 The power rate changes are minimized to help reduce the amount of fission products that are released to the RCS. The reactor return to power rates are established to prevent fuel damage by conditioning the fuel.

1.3.5 If fuel leaks are detected, the fuel is sipped during the refueling outage to prevent putting leaky elements back into the core without being repaired.

1.3.6 Crud traps and hot spots are flushed to remove the radioactive material and lower the dose rates.

1.4 Plant Design and Modification That Minimize Radiation Doses

Prairie Island was designed to minimize radiation doses. Equipment with large source terms was placed in vaults to help minimize doses to personnel. Piping and tanks that carry or store highly radioactive materials were shielded or routed through areas that have high dose rates. The Spent Resin Tank and the Waste Gas Tanks were placed in cubicles and cemented shut to prevent access.

Several modifications have been made that have helped reduce the doses at Prairie Island such as Containment Cleanup Fans suction routed to the SG primary manways for ventilation during the EC testing to the SGs; the grids on the fuel have been changed from inconel to zircalloy because of the cobalt in the inconel; a permanently installed purification system was installed as part of the CVCS system for when the plant is shutdown; and robotics are now used for EC testing of the SGs.

1.5 ALARA Reviews of Modifications

The plant Radiation Protection Staff has been given the responsibility of reviewing all modification within the Radiological Controlled Area. The RP staff has generated a checklist (PINGP 758) that should be used by engineers in the designing of systems and changes to present systems. This checklist should be used in the design phase so that elements of the program can be incorporated into modifications. A figure of $15,000 per Person-REM should be used for purposes of cost benefit analysis.

1.6 ALARA Reviews as Part of Work Control Process

1.6.1 The plant System Engineers should keep the Radiation Protection group informed of major tasks that involve their systems. The work tasks should be discussed by Work Supervisors, Work Planners, Plant Management, Engineers, workers, and the Radiation Protection Group. These discussions should center on the work procedures and means by which the radiation exposure can be minimized.

As part of the RWP generation process, the Radiation Protection Specialist should look at each job to assure that radiation exposures are ALARA.

When appropriate, post work reviews should be conducted to see where further reductions are possible in case the job will be repeated or where a similar concept can be used on other jobs.

1.6.2 The RPIPs of the Radiation Protection Manual describes the RWP requirements and procedures for routine high dose/dose rate jobs.

1.6.3 The General Superintendent of Radiation Protection, as a member of the Operations Committee, **SHALL** consider minimizing radiation exposure and radioactive waste generation when reviewing procedures as part of the Operations Committee.

1.6.4 Engineers performing design changes on the plant **SHALL** consider ALARA practices (PINGP 758) during the design and installation of plant equipment. ALARA principles **SHALL** also be included in work procedures (WR's) and in PM procedures.

1.6.5 When ordering new or replacement parts for equipment associated with the primary systems (CVCS, RCS, reactor internals, and steam generators), the System Engineer should specify low cobalt materials.

1.6.6 Operations **SHALL** consider minimizing radiation exposures and radioactive wastes during operations including isolating and draining equipment for maintenance.

1.6.7 Maintenance and contract labor **SHALL** minimize radiation exposure while working in the plant. Examples of what should be done are: (1) Minimizing time in radiation areas; (2) Utilize existing shielding or request additional shielding as needed; (3) Where not physically necessary, stand away from radiation sources as much as possible; (4) Work with the radiation protection personnel to minimize exposure.

1.6.8 The scheduling of work activities should be consistent with ALARA for minimizing radiation exposures.

1.6.9 The Radiation Protection Group **SHALL** review work for ALARA considerations. The ALARA Program describes considerations to be made with regard to ALARA review. Any work activity that can result in a total dose of 1 Person-REM should have a detailed ALARA review. This review should be concentrating on methods to reduce the dose, which should include mockups, trial runs, shielding, procedure and design review, and other complications of the work.

1.6.10 Engineering controls **SHALL** be used to the extent practical to minimize airborne radioactivity and the use of respiratory protection. Work generally can be accomplished faster when respirators are not worn.

1.6.11 On large work activities, the Radiation Protection Group should be contacted early to provide input in the procedures and design. The Radiation Protection Group is informed of upcoming work via the Operations Committee meetings, scheduling meetings, and engineers asking for assistance.

1.6.12 Radiation dose fields can be reduced by maintaining good chemistry control on the Reactor Coolant System. The boron to lithium should be kept within the band recommended by Westinghouse. The hydrogen concentration should be maintained properly. The reactor should be operated conservatively to maintain the integrity of the fuel.

The chemistry of the secondary system and other systems **SHALL** be monitored to minimize the potential corrosion damage to these systems. This can prevent failures, reduce maintenance, and reduce radiation exposures.

1.6.13 The plant **SHALL** be maintained as clean as possible to reduce radiation levels and contamination levels in the plant. By maintaining clean areas, less dose and rad waste are generated for maintenance and construction activity. Cleaning and deconning of equipment can save exposure by allowing work without respirators. However, consideration should be given to the potential dose for deconning and not deconning and the method giving the least dose should be chosen.

1.6.14 The high quality of maintenance and preventative maintenance of plant equipment is an ALARA tool. By maintaining equipment in proper working order, leaks and failures will be minimized which greatly reduces exposures.

1.6.15 All badged plant personnel (excluding office personnel) **SHALL** have training on keeping exposures and rad waste ALARA.

1.7 Source Term Reduction Program

A major item in a plant ALARA program is to maintain as low dose rates in the plant as possible. What we want to do is keep the source of radiation as low as reasonably achievable. This procedure describes in general terms the program to reduce the radiation sources.

1.7.1 Fuel Integrity

The major radioactive source available in the plant is the fuel. By maintaining the integrity of the fuel we keep that source of radiation in a controlled location. The fuel integrity control program assures that the plant is operated to maintain fuel integrity.

We must maintain controls on RCS activity to be sure that we sip fuel during the next refueling outage whenever any fuel leakage is in progress. If a major fuel defect is indicated by high alpha activity or high cesiums, ceriums, or rutheniums in the RCS, an evaluation must be made to determine if a mid cycle shutdown is needed for fuel inspection. The fact that major plant problems will develop if fuel damage is allowed inspires us to shutdown if there is an indication of fuel damage.

If there is fuel leakage but not major fuel damage, no significant dose rate increases will be observed in areas like the S/G channel heads; but there will be significant increases in the VCT, Ion Exchangers, and Waste Gas System areas. Airborne activity from iodines will be a problem.

1.7.2 Chemistry

Chemistry controls have a major impact on the dose rates in the plant. The Reactor Coolant System chemistry is controlled according to a coordinated Lithium-Boron regime which is consistant with fuel vendor recommendations and industry best practices.

If fuel cladding failure causes elevated RCS activities, steps will be taken to minimize the effect on plant dose rates.

1.7.3 RCS Purification

The CVCS Purification Systems are operated to the maximum extent practical both during operation and during outages.

Our shutdown and startup practices are modeled on industry standard methods to help limit the transport of activated corrosion products from the core to the ex-core areas.

1.7.4 Scheduling

The timing of various work can have a large impact on the dose received for that job. The scheduling department is experienced at scheduling work in the plant when the dose rate in the areas is the lowest. For example, the work in the RHR pit is done right before a shutdown as that is the lowest dose rate time for that area.

1.7.5 Maintenance

The maintenance is done with housekeeping in mind. This cleanup after maintenance work keeps much of the filings and particulate out of the RCS. Cleanliness means that when lapping is done the piping is vacuumed out and wiped out. It also means that the design of modifications and installations has keeping foreign materials out of the RCS of prime importance.

1.7.6 Modifications

ALARA reviews (PINGP 758) are part of the design change process. This review assures that materials of construction are such that cobalt input to the RCS is minimized. It also assures that construction practices are such that crud traps are minimized. Shielding is included in the design as appropriate. We look at long term plant dose in the design change process.

1.7.7 Flushing

Hot spots on various piping and drain lines are monitored for high radiation. If an area has elevated radiation levels that can be reduced by flushing, an evaluation is made that will determine if the flush can be done.

Another method of removing hot spots is to do tank cleaning. This is normally done by using a sludge type pump to pump the sludge to a spent resin liner or to a 55 gal drum. The amount of sludge that builds up is minimized by using filters in the floor drains.

1.7.8 Decontamination

We do extensive decontamination to reduce source terms. An example is the cavity decon which is done to reduce the source of radiation and also to reduce the airborne source term.

2.0 GENERAL REQUIREMENTS

2.1 Description

This section of the Operations Manual contains the radiation safety rules and procedures applicable to all personnel on site. Other specific radiation protection procedures and requirements applicable to Radiation Protection Personnel appear in Radiation Protection Implementing Procedures (RPIP's) of the Radiation Protection Manual, Count Room Manual, Computer Manual, and Chemistry Manual.

2.2 Responsibilities

The following categorizes radiation protection responsibilities of various groups:

2.2.1 Individuals

The individual **SHALL** have the following radiation protection responsibilities:

A. Comply with the rules established in this section of the Operations Manual.

B. Frequently check ED dose (every 30 minutes in non-radiation areas, 15 minutes in radiation areas, every 5-10 minutes in high radiation areas). As an individual's dose approaches the ED alarm setpoint, the ED should be checked more frequently and exit the area prior to reaching the alarm setpoint.

C. Read carefully and observe all requirements as spelled out on applicable Radiation Work Permits (RWP's) or as displayed on the Electronic Dosimeter Log-In screen.

D. Take special care to assure they are free of detectable contamination before leaving the Radiologically Controlled Area (RCA) and the Restricted Area.

E. Observe and ensure understanding of radiological postings.

F. Correctly record their exposure upon leaving the (RCA) as necessary.

G. Keep exposure ALARA by refraining from lingering in radiation fields, by maximizing distance from radiation source, by utilizing existing shielding, and by reviewing work procedures and conducting as much preliminary work outside radiation areas as feasible.

H. Report all wounds and skin contamination received while in the RCA.

I. Provide feedback to Supervisors and Radiation Protection Group on ways to reduce exposure.

J. Minimize radioactive waste by removing materials from packages prior to entry into the RCA and by minimizing materials taken into contaminated areas.

K. Auxiliary Building Floor Drains - Only materials considered nonhazardous and approved in accordance with the current NPDES permit, may be released to the radioactive waste treatment system. Contact the Radwaste System Engineer, Environmental Compliance Coordinator or designee for material disposal instructions in the Auxiliary Building. Refer to D14.5, Hazardous and Nonhazardous Material Storage, Disposal and Labeling Requirements, for disposal, storage and labeling requirements.

L. Verify barrier or barricade (swing gate, rope, door) is CLOSED or back in place after entering or exiting a HRA or LHRA.

M. Refrain from eating, drinking, smoking or chewing (gum, tobacco, toothpicks, etc.) in the RCA (Radiologically Controlled Area – includes Aux Bldg, Containments, Rad Waste Bldg, Resin Disposal Bldg, Rad Waste Storage Bldg or special areas setup on site). Special areas may be set up in the RCA to allow drinking or eating as designated by the General Supt RP and Chem.

N. Wear electronic dosimeter and TLD within a hand's width of each other on the upper body (chest area), or as exempted by the RWP.

O. In addition to the above requirements, abide by the following Generic RWP requirements:

1. **COMPLY** with the RWP and Access Computer Log-in Screen requirements.
2. **ENSURE** proper dosimetry is worn (TLD and dosimeter, minimum) and verify ED is turned ON.
3. **CONTACT** Duty RPS prior to entering the RCA (each entry and prior to changing job scope). Routine watchstanding is exempt from this requirement.
4. **BE** knowledgeable of work area dose rates (including hot spots) and minimize dose using time, distance and shielding.
5. **ABSOLUTELY** no entry into "Radiographing Areas".
6. **UPON** observing a radiological alarm (Electronic dosimeters, area monitor, or CAM) immediately evacuate the area and contact the RP Group.
7. **OBSERVE special requirements for High Radiation Area entry; KEEP locked doors locked except for entry.**
8. Prior to cutting, welding, grinding, burning, sanding, buffing or anything that will disturb contamination, **CONTACT** RP Group to determine contamination levels.
9. **OBSERVE** radiological postings and barriers. Postings and barriers can only be moved under the direction of Radiation Protection Group. Ensure all entrance barriers are in place after each entry/exit.
10. **OBTAIN** RP survey and approval prior to removing items from the RCA (Radiologically Controlled Area).
11. **HAVE** Radiation Protection present when removing any items from any fuel pool.
12. DO NOT **MOVE** or reposition any shielding.
13. **CONTACT** the Containment RPS each entry.
14. **MONITOR** for contamination using the Friskall upon leaving the RCA.

15. **CONTACT** RP Group prior to entering areas eight (8) feet above the floor (with the exception of areas with permanent ladders). Areas eight (8) feet above the floor are not routinely surveyed.

2.2.2 Supervisor

Each Supervisor **SHALL** have the responsibility to:

A. Ensure their workers obey the rules spelled out in this section and the instructions on Radiation Work Permits (RWP's).

B. Oversee individual exposures received and authorize exposure of personnel based on present and future work requirements.

C. Assist Radiation Protection in pre-work training exercises designed to reduce work exposure.

D. Assure their workers are covered under the protective requirements of a Radiation Work Permit (RWP) when working in posted areas and the RCA.

E. Attempt to keep their workers' exposure ALARA by reviewing work procedures.

F. Ensure their workers minimize the amount of radioactive waste produced by removing packaging materials from components prior to entry into the RCA.

G. Ensure their workers process oil and solvents as per D55, Hazardous Waste.

2.2.3 Radiation Protection Group

The responsibilities of the Radiation Protection Group are spelled out in 5AWI 3.1.0 and in the RPIPs (Radiation Protection Implementing Procedures).

2.2.4 Engineering Personnel

Engineers and Work Planners **SHALL** be aware of radiation exposure concerns while writing design changes and WR packages keeping in mind the ALARA concept.

2.2.5 Corporate Radiation Protection Support Group

The Corporate Radiation Protection Support Group is responsible for review and assessment of the plant's radiation protection program. They provide suggestions for improvements to the program as well as assessments to report to management on program effectiveness. They also are responsible for monitoring other industry events and regulatory activity in the radiation protection area to provide input to improve the plant radiation protection program.

2.3 Radioactive Waste Management

M This section is in this procedure to address an ANI concern. Radioactive Waste Management at Prairie Island is the responsibility of the Radiation Protection Group. Normally an engineer is assigned to keep track of solid waste generation, storage, and shipping schedules. The Radiation Protection Group will direct the packaging and procedures for shipping rad waste off site. They will write the required procedures and work requests for solid waste management. Radwaste Engineering personnel also monitor and direct the processing and handling of liquid and gaseous rad waste systems. They are responsible to communicate their flow path direction to the Operations Department.

3.0 AREA CONTROL

3.1 Definitions

3.1.1 Barrier/Barricade

Device used to prevent inadvertent access to a High Radiation Area.

3.1.2 Restricted Area

An area where access is limited by the licensee to protect individuals from exposure to radiation or radioactive materials. This is the area inside the double security fenced area including the double fence area for the plant and the Independent Spent Fuel Storage area (ISFSI).

3.1.3 Controlled Area

An area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason. This is the area inside the area fence along County 18 and outside the Restricted Area.

3.1.4 Radiologically Controlled Area (RCA)

A Radiologically Controlled Area is any area to which access is limited and controlled for the purpose of managing occupational radiation exposure. This normally includes the Auxiliary, Radwaste and Resin Disposal Buildings and the area of the ISFSI inside the double fence area, excluding the double fence area.

3.1.5 Posted Area

Areas where contamination levels are above the applicable limit have a boundary or barrier of yellow and magenta rope or tape or areas where radiation levels are above the applicable limit are posted (radiation sign) or have a boundary or barrier and boundary of yellow and magenta rope or tape if part of a contaminated area. Yellow and magenta rope (tape, ribbon) should not be used for non-radiological purposes. These areas **SHALL** be posted, according to their respective requirements, with one or more magenta and yellow signs bearing a radiation symbol and the wording: CAUTION, RADIATION AREA; CAUTION or DANGER, HIGH RADIATION AREA; GRAVE DANGER, VERY HIGH RADIATION AREA; CAUTION, AIRBORNE RADIOACTIVITY AREA; CAUTION RADIOACTIVE MATERIALS AREA; or CAUTION, CONTAMINATED AREA.

3.1.6 Unrestricted Area

An area to which access is not limited or controlled by the licensee. This is the area outside the Controlled Area which is bordered by the fence along County Road 18.

3.2 Radiation and Contamination Limits

3.2.1 Unrestricted Area

All operations **SHALL** be conducted so the levels of radiation in unrestricted areas and the concentrations of radioactive material in effluents to unrestricted areas **SHALL** be within the limits set forth in 10CFR20.

3.2.2 Radiation Areas

A Radiation Area is an area accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 30 cm (12") from the radiation source. These areas **SHALL** be conspicuously posted with a sign bearing the radiation symbol and the word, "CAUTION, RADIATION AREA".

3.2.3 High Radiation Areas

Definition - An area, accessible to personnel, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 mrem in one hour at 30 cm (~12") from the radiation source. An area with a radiation field of 100 mrem/hr or greater and less than 1000 mrem/hr at 30 cm (~12") from the source **SHALL BE CONSIDERED** a High Radiation Area. These High Radiation Areas **SHALL** be posted and barricaded. The barricade can consist of a rope or chain or swing arm across the entrance. Barricade **SHALL** be verified in place after entry or exit of area. The posting **SHALL** bear the radiation symbol and the words "DANGER" (or "CAUTION") "HIGH RADIATION AREA."

Entry Requirements - Entry **SHALL BE CONTROLLED** by the issuance of a Radiation Work Permit.

A. Individuals qualified in radiation protection procedures (RPS, contract RPS) or personnel continuously escorted by a person qualified in radiation protection procedures **MAY BE EXEMPT** from the RWP issuance requirement during the performance of their assigned duties.

B. Any individual or group of individuals permitted to enter High Radiation Areas **SHALL BE PROVIDED** with one or more of the following:

1. a radiation monitoring device which continuously indicates the radiation dose rate, such as; a Mini-Rad or RO-2/2A;

   or,

2. a device that continuously integrates the dose rate in the area and alarms when a preset integrated dose is received, such as; an Electronic Dosimeter. Entry into such areas with this device **SHALL** be made only after the dose rate levels have been established and personnel are aware of them;

   or,

3. an individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and **SHALL** perform periodic radiation surveillance at the frequency specified by the radiation protection manager.

3.2.4 Locked High Radiation Area

Definition - An area accessible to personnel in which the radiation levels **ARE** greater than or equal to 1000 mrem/hr at 30 cm (~12").
T.S.6.7.B (IT.S.5.7.2) **REQUIRES** that High Radiation Areas where the dose rate is equal to or exceeds 1000 mrem/hr and less than 500 rad/hr **SHALL BE LOCKED** or **GUARDED** and access to these areas **SHALL BE CONTROLLED**. The keys to these areas **SHALL BE CONTROLLED** administratively by the Plant Manager. Doors **SHALL** remain locked except during periods of access by personnel under an approved RWP. The area **SHALL** be posted with a sign bearing the radiation symbol and the words "DANGER" or "LOCKED HIGH RADIATION AREA".

Entry Requirements - Entry **SHALL BE CONTROLLED** by the issuance of a Radiation Work Permit that specifies the dose rate levels in the immediate work area and the maximum allowable stay time.

A. Individuals qualified in radiation protection procedures (RPS, contract RPS) or personnel continuously escorted by a person qualified in radiation protection procedures may be exempt from the RWP issuance requirement during the performance of their assigned duties.

B. In lieu of the stay time specified on the RWP, a specified dose limit for entry into the area may be specified. This normally will be done with the electronic dosimeter and will be more limiting than the stay time as the dose limit will be individual specific.

C. In lieu of the stay time specified on the RWP, direct or remote (such as closed circuit TV or transmitting radiation monitoring device) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive control over the activities being performed within the area.

D. If the Locked High Radiation Area is in a large building, such as the containment, and it cannot be locked or guarded and it is not feasible to construct an enclosure around the area, the area **SHALL BE BARRICADED**, and **CONSPICUOUSLY POSTED** and a flashing warning light **SHALL BE ACTIVATED** as a warning device.

3.2.5 Several areas within each plant have high radiation levels (>10 rem/hr) that don't meet the requirements of a Very High Radiation Area, but yet the dose rates are high enough that additional controls should be taken for these areas. They are:

A. the reactor cavity area while at power,

B. the reactor coolant loop vault area during power operation (N-16 initiated dose rates of 10 to 100 rem/hr),

C. the Spent Resin Tank area,

D. the ion exchangers used in the CVCS and spent fuel pool cooling systems, and

E. Containment during flux mapping with incore instrumentation.

1. Access to these areas requires a special key and permission from the General Superintendent of Radiation Protection and Chemistry.

2. Stay times for these areas **SHALL** be specified on the RWP.

3.2.6 **Very High Radiation Areas**

A Very High Radiation Area is an area accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at one meter (3') from the radiation source. Very High Radiation Areas **SHALL** be barricaded and conspicuously posted with the radiation symbol and the words, "GRAVE DANGER, VERY HIGH RADIATION AREA". Two areas of each plant are considered Very High Radiation Areas, the Fuel Transfer Tube Area and the Sump C (Thimble Chase) area. The Fuel Transfer Tube Areas have a poured cement shield but they also have a cement block access opening which has a wire cage to prevent access. Access to these areas requires the permission of the Plant Manager. Keys **SHALL** only be issued to members of the RP Group. Access to these areas **SHALL NOT** be allowed without measures taken to reduce the dose rates in the areas; such as, pushing the thimble tubes into the reactor vessel or stopping fuel handling respectively. 5AWI 5.3.0, Key Control, contains the procedure for obtaining the key.

3.2.7 Airborne Radioactivity Area

Any area in which airborne radioactive materials exist in concentration in excess of 30% of the DAC limit as tabulated in Appendix B, Table 1, Column 1 of 10CFR20, **SHALL** be conspicuously posted with a sign or signs bearing a radiation symbol and the words, "CAUTION" (or "DANGER") "AIRBORNE RADIOACTIVITY AREA." All exposed surfaces in an Airborne Radioactivity Area are assumed to be contaminated.

3.2.8 Contaminated Area

Any area accessible to personnel in which surface contamination exists above 10 dpm/100 cm^2 alpha and/or 100 dpm/100 cm^2 beta-gamma as determined by smear tests, should be barricaded or roped and conspicuously posted with the radiation symbol and the words, "CAUTION, CONTAMINATED AREA".

It is permissible to reach across contaminated area boundaries without touching items. Rubber, surgeon, or work gloves should be worn to touch items.

3.2.9 Radioactive Materials Area

Any area accessible to personnel in which there exists radioactive material in an amount which exceeds 10 times Appendix C, 10CFR20 **SHALL** be conspicuously posted with the radiation symbol and the words, "CAUTION, RADIOACTIVE MATERIALS AREA."

3.3 Access Control

The following are requirements for access in to the RCA:

3.3.1 All personnel are required to follow the requirements of a Radiation Work Permit while in the RCA.

3.3.2 Normally only one manned access control point is permitted to control entry into the RCA. Entries other than this point **SHALL** be cleared with the Shift Manager and the General Supt. of RP and Chemistry.

3.4 Radiation Work Permit (RWP)

3.4.1 All entries into the RCA require the use of an RWP (Radiation Work Permit). The RWP is a method of communicating and controlling the radiological precautions necessary to ensure safe work practices.

3.4.2 Instructions and requirements in RWPs **SHALL** be followed by all personnel.

3.4.3 A copy of the RWP is located at Access Control.

3.4.4 All personnel **SHALL** be aware of the requirements of the RWP covering their activity and be familiar with the radiological conditions for the area.

3.4.5 The Radiation Protection Group should notify workers of major changes in the RWP. This is normally accomplished by a revision which requires reading the RWP while logging on the computer login screens.

3.4.6 The personnel using the RWP should verify the description of work on the RWP is accurate.

3.4.7 Personnel should carefully read the protective clothing requirements and ensure they understand the requirements.

4.0 PERSONNEL PROTECTION AND CONTROL

4.1 Indoctrination

All personnel on site, other than escorted visitors, are indoctrinated in radiological safety, security, emergencies, fire protection, etc. as described in 5AWI 3.11.0.

4.2 Radiation Exposure

4.2.1 Internal Dose

The amount of internal dose received at Prairie Island is very low and is normally not a problem. Dose to internal organs is called Committed Dose Equivalent, CDE. It is the 50 year committed dose to an organ due to intake of radioactive material whether the intake is from inhalation, ingestion or absorption.

The internal dose to an organ is equated to external dose using Weighting Factors, WF. The Weighting Factors are assigned to individual organs based on the risk to that organ when equated to the total risk from external dose. The internal dose to an organ (CDE) is multiplied by the Weighting Factor (WF) to obtain the Committed Effective Dose Equivalent, CEDE. CEDE is the internal dose portion of total dose. One rem of external dose is equal to one rem of CEDE internal dose.

4.2.2 External Dose

External dose can be dose to the wholebody, skin, extremities and lens of the eye.

External wholebody dose is called Deep Dose Equivalent (DDE) and is normally measured by TLDs.

External dose to the skin is called Shallow Dose Equivalent, Wholebody (SDE,WB) and is normally measured by the TLDs. The SDE,WB is limited to 50 rem per year. Prairie Island has established an administrative dose guideline of 20 rem per year.

External dose to the extremities is called Shallow Dose Equivalent, Extremities (SDE,E) and is normally measured by special issue extremity badges. The SDE,E is limited to 50 rem per year and Prairie Island has established an administrative dose guideline of 20 rem per year.

Dose to the Lens of the eye is called Lens Dose Equivalent, LDE, and is normally measured by the TLD. The LDE is limited to 15 rem per year. Prairie Island has established an administrative dose guideline of 6 rem per year.

4.2.3 Total Dose

There are two total dose limits that are in effect at Prairie Island, Total Organ Dose Equivalent (TODE) and Total Effective Dose Equivalent (TEDE).

Total Organ Dose Equivalent (TODE) is the sum of DDE and CDE and indicates the total dose to an organ. TODE **SHALL** be limited to 50 rem per year. Prairie Island has established administrative guideline of 20 rem per year. This guide can be increased with management approval.

Total Effective Dose Equivalent (TEDE) is the sum of Deep Dose Equivalent (DDE) and Committed Effective Dose Equivalent (CEDE). TEDE **SHALL** be limited to 5 rem per year. Prairie Island has established administrative dose guideline of 2 rem per year. This guide can be increased with management approval.

4.2.4 Dose to Minors

The yearly dose limits to minors are 10% of the above dose limits (0.5 rem TEDE; 5 rem TODE; 1.5 rem LDE; and 5 rem SDE,WB and SDE,E). The administrative dose guidelines to minors are also 10% of the adult administrative dose guidelines.

4.2.5 Dose to Embryo/Fetus

The dose to the embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant female, **SHALL NOT** exceed 0.5 rem. The dose to the embryo/fetus is the sum of the Deep Dose Equivalent (DDE) to the declared pregnant female and the dose to the embryo/fetus from radionuclides in the embryo/fetus and the declared pregnant female. Efforts **SHALL** be made to avoid substantial variation above a uniform monthly exposure rate. Prairie Island has established an administrative dose guideline of 50 mrem per month or 450 mrem for the entire gestation period, whichever is more limiting. Details of dose control to the embryo/fetus is contained in Section 14.0 of F2.

4.3 Personnel Exposure Control (Plant Administrative Controls)

Periodically, supervisors should review the exposure history for their workers. This information should then be used for work assignments. During outages, the Radiation Protection Group should provide exposure records to all group supervisors.

Visitors are allowed access to the RCA provided they do not enter a High Radiation Area or Very High Radiation Area.

Further exposure control techniques are specified in the Radiation Protection Implementing Procedures.

4.4 Personnel Monitoring Techniques

4.4.1 External Monitoring

Electronic dosimeters (EDs) and thermoluminescent dosimeters (TLDs) **SHALL** be worn on the upper area of the body (chest) within one hand's width of each other or as exempted by RWP.

External monitoring is accomplished using TLD (Thermoluminescent dosimeter), electronic dosimeters, direct reading dosimeters, and neutron TLD's. Official exposure is obtained from the vendor TLD results for DDE (whole body), SDE,WB (skin of whole body) LDE (lens of eye), SDE,E (extremity) and from vendor neutron TLD's for whole body. (RPIP's contain further instruction for the Radiation Protection Specialists on this topic.)

4.4.2 Internal Monitoring

Internal monitoring for gamma emitting radioisotopes is accomplished by passive monitoring on the Friskall monitors. Additional whole body counts are obtained as specified in RPIPs.

4.5 Personnel Contamination Control

The following are methods employed at Prairie Island to protect personnel from radioactive contamination and to monitor for contamination.

4.5.1 Protective Clothing

The use of protective clothing and the proper procedure for exiting a posted area with a step-off pad for both single suit and double suit protection is outlined in the Anti-C Clothing Removal Procedure section of F2.

4.5.2 Personnel Contamination Check

All personnel who exit the site should normally pass through the exit portal monitor located in the guardhouse. All personnel who exit the Aux Bldg **SHALL** pass through the portal monitor at Access Control and the Friskall monitor or personnel frisking at Access Control. IF work requires alternative exit, THEN obtain RP Supervisor approval and frisking requirements. If any of these monitors are out of service, the Radiation Protection Supervisor or designee **SHALL** determine the appropriate personnel monitoring at Access Control.

A. Frisking of hands, feet, and suspect areas **SHALL** be performed per RWP at closest available frisker prior to putting on personnel clothing.

1. Slowly (about 3 inches per second) move both hands close to the frisking probe and check hand not contaminated (clean) prior to picking up probe. Listen for an increase in the count rate and stop the probe if the count rate increases. The Frisker probe should be within ½ " of the body surface and it is permissible to touch the probe against the article being frisked.

2. Slowly frisk to ensure free of contamination. Pay particular attention to the exposed areas of the body and areas that may have rubbed against surfaces, such as the knees, arms, or back.

3. Frisk the dosimeters and TLD if they were worn outside the protective clothing.

4. If the alarm on the frisker sounds or the count rate has increased on any part of the body, contact the RP group for assistance. If there is no one at the area that can contact the RP group, suit up in the clean Anti-C's and proceed to Access Control.

4.5.3 Contamination Monitoring Equipment

The following outlines the use of equipment to assure contamination control:

A. G-M Ratemeters (Friskers) - Eberline RM-14 count rate meters equipped with shielded pan-cake probes are located at strategic locations. They are used for body frisking after anti-C removal in cases where the individual suspects body contamination or as required on the RWP. The friskers are very inefficient if they are not moved slowly over the body; the maximum speed should not exceed 3 inches per second.

B. Hand & Foot Monitor - A Hand & Foot Monitor may be located at the containment step-off pad area. Personnel should follow locally mounted instructions for proper use of the monitor.

C. Sensitive plastic scintillation detector portal (Gamma-60) monitors are located at Access Control and at the Guardhouse. The detector response time is less than one second, therefore, it is not necessary to stop while walking through the monitor.

If the monitor alarms, reset the alarm, ensure the green light is on, back away from the monitor, then walk through again. If the portal alarms the second time, contact the Rad Protection Group.

D. A highly sensitive "Friskall" booth type monitor is located at Access Control. It can replace the Frisker as a total body contamination monitor. The counting time for the front of a person is started by pressing and holding a foot pedal until the front count is complete as indicated by the second "beep". Personnel should hold their hands up to the detectors during the front and back counts to ensure good monitoring of the hands. The person then **SHALL** turn around and activate the count on the back of the body by pressing and holding the foot pedal until the back count is complete as indicated by the second "beep". If a person is contaminated, the monitor will alarm and an RPS should be contacted to aid in decontamination.

4.5.4 Personnel Decontamination

Contact the Radiation Protection Specialist for assistance if you detect contamination on yourself. Personnel decontamination procedures are described in detail in the RPIPs. In almost all cases, washing or showering is a sufficient method of decontamination.

4.6 Access Control Procedures

4.6.1 Personnel who enter the RCA are required to log-in on the Access Control Computer System or on the Access Control Cards as directed by the RP Group. The computer screen display of the RWP satisfies the requirements of reading the RWP.

4.6.2 When exiting the RCA, all personnel **SHALL** go through the Friskall portal monitor or frisk as defined by the RP Supervisor or designee.

4.6.3 When exiting the RCA, personnel should record their dosimeter reading by logging out on the Access Control Computer System or as directed by the RP Group.

4.7 Hot Particle (Speck) Program

General Discussion

With the advent of new high sensitive portal and booth type monitors, many nuclear plants have been able to detect very discrete particles (invisible to the naked eye) with high specific activity. At some plants the hot particles are fission products with very high beta energies. At Prairie Island we have only seen Cobalt-60 hot particles which have low beta energies, but high dose rates which can cause very high doses in localized areas.

At Prairie Island we have modified the work process around fuel pool water to require extra protective clothing for removing materials from the pool water and for laying on the floors. We also conduct Masslinn (oil cloth) surveys in fuel pool areas and routinely throughout the plant.

A special dose assessment procedure will be conducted for people who do get hot particles on their skin.

5.0 EQUIPMENT CONTROL

The purpose of equipment control is to prevent the spread of radioactive material and contamination into clean or uncontrolled areas and to minimize dose. Refer to Control of Radioactive Materials of this procedure for contaminated tool and equipment control.

Conditional Release to the Clean Area (white tag)

Radioactive equipment used in the Radiologically Controlled Area (RCA) may be conditionally released from the RCA provided it is under the control of the Radiation Protection Group. Normally, radiation levels resulting in greater than 2 mR/hr whole body exposure should require area control. Equipment should be tagged with a white tag which may not be removed while the equipment is in the Clean Area. A log is maintained at Access Control for equipment removed from the Controlled Area.

6.0 RADIOACTIVE MATERIAL HANDLING

Procedure for handling radioactive material such as waste shipments, source handling, radioactive effluents, fuel receipt, equipment decontamination, etc., appears in appropriate C, D, and G sections of the Operations Manual and the RPIPs.

7.0 RADIATION OCCURRENCES

7.1 General

A course of action is required to deal with radiation occurrences. This is necessary for evaluation of compliance with licenses and regulations, and to determine the adequacy of the radiation protection program. Outlined below are the criteria and reporting requirements and the course of action necessary.

7.2 Criteria for Judging Radiation Occurrences

Radiation occurrences are normally events involving radioactive materials or contamination. They are events not normally expected and, therefore, not normally anticipated. They can result from rule violations and carelessness. In general, they consist of:

7.2.1 Unexpected contamination (personnel and area)

7.2.2 Unexpected radiation exposures or electronic dosimeter dose alarms

7.2.3 Unexpected internal uptake of radioactive material

7.2.4 Unauthorized radioactive material releases to the environment

7.2.5 Unexpected radioactive material released in the plant

7.2.6 Loss of radioactive material

The Corrective Action Process is used for more serious problems, such as 7.2.2 - 7.2.6.

7.3 Reporting Radiation Occurrences

Each individual **SHALL** have the responsibility to report detected radiation occurrences to the Radiation Protection Group. Condition Reports may be submitted and a direct call to the Lead RPS @ 4475 can be performed.

7.4 Action Required

Immediate emergency action may be necessary as described in the Emergency Plan, Section F3-2. Follow-up action is required by the General Superintendent of Radiation Protection and Chemistry (GSRP&C). With the assistance of the Radiation Protection Group, he **SHALL** evaluate the radiation occurrence as rapidly as possible and determine what additional action may be necessary.

A Condition Report **SHALL** be filled out for all genuine occurrences. The General Supt. Radiation Protection and Chemistry **SHALL** ensure assessments of these Condition Reports are performed.

8.0 RESPIRATORY PROTECTION

Purpose and Policy Statement

Airborne radioactive materials within the plant are maintained below the Derived Airborne Concentration (DAC) whenever practicable by use of process engineering controls, containment ventilation, and portable ventilation filter units.

It is necessary, however, that some work be performed in respirators in confined or localized areas of high airborne activity such as steam generator nozzle dam installation, reactor cavity decon, cutting into radioactive systems, or repairing radioactive equipment.

Respiratory protective equipment allows the required work in some airborne situations to be accomplished with greater safety and lower exposure to radioactive materials than by not using respiratory protective equipment. Further details of the Respiratory Protection Program are defined in the RPIPs and H-26.

9.0 CONTAINMENT ENTRY PROCEDURE

9.1 General Discussion

Containment entries are NOT allowed during flux mapping with the reactor critical. The following procedure outlines the measures necessary for containment entry during Mode 2, Hot Standby (**IT.S. Startup**) and Mode 1, Power Operation.

9.1.1 Containment entry during Mode 6, Refueling, Mode 5, Cold Shutdown, Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**), and Mode 3, Hot Shutdown (**IT.S. Hot Standby**) are controlled by the issuance of RWPs in conjunction with RPIP-1729; Initial Containment Entry.

9.1.2 Containment entry is NOT permitted during reactor startup or during reactivity changes while the reactor is critical.

9.1.3 All entries during Mode 2, Hot Standby (**IT.S. Startup**) and Mode 1, Power Operation **SHALL BE MADE** by more than one person and normally a Radiation Protection Specialist should accompany the entering party.

9.1.4 Entries by a single individual are permitted during Mode 3, Hot Shutdown (**IT.S. Hot Standby**), Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**), and Mode 5, Cold Shutdown based on a supervisory review of work hazards. The work area thermal conditions should be considered when allowing individual entries.

There are two parts to this procedure; normal entry into Mode 1, Power Operation and Mode 2, Hot standby (**IT.S. Startup**) and emergency entry into Mode 1, Power Operation and Mode 2, Hot standby (**IT.S. Startup**). Emergency entry is defined as an entry which is not controlled by the Radiation Protection Group.

9.2 Requirements

Specific requirements for containment entry while in Mode 2. Hot Standby (**IT.S. Startup**) and Mode 1 Power Operation are spelled out in these procedures.

9.2.1 The entry team **SHALL** be equipped with dosimeters, TLD's, and a beta-gamma survey instrument.

9.2.2 Entry into the RC loops and Reactor Cavity **SHALL NOT** be permitted without permission from the Superintendent of Radiation Protection and Chemistry or his designee.

9.2.3 Prior to containment entry, contact the Shift Supervisor to confirm the following:

A. There is not flux mapping or incore detector movement in progress. Very high radiation dose rates and possible overexposures can be caused by the incore detectors.

B. The Shield Building Ventilation Systems are secured.

9.2.4 IF the Unit is in one of the following Modes:

Mode 1, Power Operation

OR

Mode 2, Hot Standby (**IT.S. Startup**)

OR

Mode 3, Hot Shutdown (**IT.S. Hot Standby**)

OR

Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**)

THEN one shield building door at each entry **SHALL** be closed at all times.

9.2.5 Before entry, a pre-job briefing **SHALL** be conducted with those entering and Control Room personnel, as appropriate. This pre-job briefing **SHALL** include a discussion of all tour/work locations and anticipated radiation levels (PINGP 1112).

9.2.6 All personnel entering the containment **SHALL** check in with the Control Room, or the designated person at the airlock, if posted.

When contacting Control Room prior to Containment entry at power, **ensure** all personnel are wearing a TLD and Electronic Dosimeter (ED) and the ED is turned on (number and mRem indicated within the window).

9.2.7 All personnel should use discretion when temperatures are above 85 degrees. The guidelines for heat stress in the Safety Manual should be reviewed. Backup teams and stay times may be required.

9.2.8 When all personnel are out of the containment, the personnel and maintenance airlock hatches **SHALL** be locked.

9.2.9 Post-job brief required.

9.3 Procedure

9.3.1 Normal Entry into Mode 1, Power Operation and Mode 2, Hot standby (IT.S. Startup)

This procedure is for routine inspection, operation, and work.

A. Refer to the general requirements in this procedure Section 9.2.

B. Verify the internal cleanup fans are operating 24 hours prior to entry, if necessary.

Based on R-11 and R-12 containment air monitors, and based on recent air samples, air sampling may not be required.

C. Contact the Radiation Protection Group at least 6 hours before the entry for an air sample.

D. The Radiation Protection Group should draw samples and analyze for the following:

1. Particulate Activity
2. Gaseous Activity
3. Iodine
4. Tritium

E. Observe the requirements of the Radiation Work Permit.

9.3.2 Emergency Entry into Mode 1, Power Operation and Mode 2, Hot standby (IT.S. Startup)

Emergency entry is defined as non-routine entry for inspection or operation such as a fire alarm or a limit switch position check.

A. Refer to the general requirements in this procedure Section 9.2.

B. If R-11 and R-12 of the appropriate unit are:

1. Not alarming and normal readings, entry may be made without any respiratory protection.

2. Alarming on scale, entry may be made with the use of a MSA Ultralite II.

3. Alarming off scale, no entry may be made without the Supt. Rad Protection or designee appraisal and approval.

C. Observe the requirements of the Radiation Work Permit.

10.0 ANTI-C CLOTHING AND REMOVAL PROCEDURE

10.1 General Discussion

This procedure is designed to familiarize all personnel with the preferred procedure to use when removing single and double sets of Anti-C clothing at SOP's. The intent of proper clothing removal is to keep personnel free of contamination, keep contamination in a controlled area, and keep the SOP itself clean. Some circumstances will arise calling for better protection by wearing rubber suits and air fed suits. In these situations, the Rad Protection Group should be available to help with the unsuiting process.

The general intent of clothing removal at a multiple SOP is to remove the most contaminated item first, normally the outer gloves. Then the outer head protection and respiratory protection; if worn, should be removed. The coveralls should then be removed followed by outer footwear while stepping onto the SOP.

10.2 Protective Clothing

The main purpose of protective clothing is to prevent personnel contamination of the skin. In some cases the protective clothing also prevents skin exposure from beta radiation.

Cotton liners **ARE NOT** considered protective clothing and **SHALL NOT** be worn without additional protection.

The different types of protective clothing are specified on the RWP or RWP Log-In Screen (Access Computer Log-In system). They include "Bootie and Glove Suit-up", "Lab Coat Suit-up", "Normal Full Suit-up", "Normal Full Suit-up - Sealed", "Double Suit-up - Paper", "Double Suit-up - Plastic", and "Special Suitup".

The "Normal Full Suit-up" can be specified with or without sealing. If sealing is specified, the tape or elastic band or Velcro band should be applied to the rubber glove (work glove) and coverall junction, and the bootie and coverall junction. "Sealing" means the use of tape or elastic bands or velcro straps where "taping" means only the use of tape. Double suit-ups will always require the use of tape. Tape may also be used at the liner and coverall junction to prevent liner removal with the outer glove.

Rubber gloves should be used whenever working with a wet surface or when working on the internals of a radioactive system. Cloth (canvas) glove may be for all other situations.

10.2.1 The "Bootie & Glove Suit-up" includes some type of protective foot cover and rubber gloves or work gloves or surgeons gloves. This suit-up should not be used in congested areas where activities are likely to cause contact between contaminated surfaces and skin or clothing. This suit-up requires RPS approval (as per RWP).

10.2.2 "Lab Coat Suit-up" includes a lab coat, rubber gloves or surgeons gloves, and some type of protective foot cover. This suit-up requires RPS approval (as per RWP).

10.2.3 "Normal Full Suit-up" includes coveralls, surgeons cap or hood, (discretionary) cotton liners with rubber gloves or work gloves or surgeons gloves, and booties and rubbers or booties and shoe covers. Normally a hood is worn when a respirator is required. This suit-up does not normally require taping or sealing. If sealing is required it will be specified after the type suit-up.

10.2.4 "Double Suit-up - Paper" includes all of the items specified for a "Normal Full Suit-up" as the inner set of PCs (Protective Clothing) and then an additional full suit-up including rubber gloves, paper coveralls, hood, and an extra pair of protective foot covers. A double suit-up always requires taping of the arm and leg junctions.

10.2.5 "Double Suit-up - Plastic" includes all of the items specified for "Normal Full Suit-up and then an additional full suit-up including rubber gloves, plastic coveralls, hood (normally air fed hood for personal comfort), and an extra pair of protective foot covers. The double suit-up always requires taping of the arm and leg junctions. An RPS will normally help personnel into and out of this type of suit-up.

10.2.6 "Special Suit-up" - This suit-up will be developed to meet the needs of special job situations.

10.3 Procedure

10.3.1 Single Set Anti-C's Removal

This procedure is written for a full single set of Anti-C's as described in the General Discussion and used at a single SOP other than the containment SOP. The last thing to be removed prior to stepping onto a SOP is the protective clothing on the feet.

The only suit-up clothing a person should have on while standing on the SOP is cotton or nylon liners.

The following procedure should be followed to minimize the spread of contamination:

A. Approach the SOP area, remove the tape or elastic band, if necessary, around the rubber gloves and place tape in waste cart.

B. Remove the rubbers on the feet and deposit in the clothing cart.

C. Remove the rubber gloves inside out and place in the clothing cart.

D. Carefully remove the hood if worn, by opening the seam at the chin, pull both sides around to the back of the head, and deposit in the clothing cart.

E. Remove the respirator, if worn, by pulling up and back on the chin piece. Place respirator in clean poly bag.

F. Carefully remove surgeons cap if worn, by leaning forward or back towards the container and deposit in the clothing cart.

G. Remove tape or elastic strap on outside of legs, if necessary.

H. If dosimetry is worn in outside pocket, remove and place on personal neck lanyard.

I. Remove the coveralls inside out by slipping over shoulders; remove TLD and dosimeter and put on frisker cart (if worn on coveralls); continue removing coveralls and place in clothing cart.

J. Remove one foot bootie and place that foot down on the SOP and place bootie in proper clothing cart. Remove the other foot bootie and place that foot down on the SOP and place the bootie in the proper clothing cart.

K. Remove the glove liner and place in the clothing cart.

L. Monitor as required by the RWP.

10.3.2 Double Anti-C Removal

A. This section is written in general terms for the removal of the outer set of clothing at the first SOP encountered when exiting an area. The inner set of clothing is removed as per the above "Single Set Anti-C Removal" procedure. This procedure is written in general terms as many types of double suitups may be encountered. Suit-ups more complicated than this will normally require direct RPS assistance.

B. Remove the outer set of gloves.

C. Remove outer head protection and respirator, if worn.

D. Remove outer set of coveralls.

E. Remove one outer shoe cover and step onto SOP in one continuous motion.

F. Remove the other outer shoe cover and step onto SOP in one continuous motion.

G. Proceed to second SOP and remove inner set of clothing as per single set Anti-C removal.

11.0 CONTROL OF RADIOACTIVE MATERIALS AND RAD WASTE

11.1 Purpose

The purpose of this instruction is to provide guidelines for minimizing radioactive waste and establish a definite procedure for control of contaminated tools and equipment. This procedure is designed to maximize the control of contaminated equipment and minimize personnel inconvenience and exposure.

11.2 Precaution

Read all signs on tool and equipment racks prior to touching or removing equipment. When in doubt, contact an RPS.

11.3 Minimizing Radioactive Waste

Disposal of radioactive waste is very expensive, labor intensive, and uses limited waste disposal site capacity. The cost to dispose of a roll of tape is greater than the original cost of the tape. Therefore, exceptional efforts should be taken to minimize the generation of radioactive waste.

11.3.1 Packing materials should not be taken into the RCA.

11.3.2 Waste should be segregated at the source as defined by the RP Group.

11.3.3 Launderable protective clothing should be used as much as possible.

11.4 General Discussion

This instruction is written to help solve many of the problems associated with control of contaminated tools and equipment.

Three large storage racks have been established for control of radioactive equipment in the Hot Machine Shop Area.

11.4.1 Items to be Decontaminated (Rack A, 695 Decon Area)

The rack labeled "Items to be Decontaminated" is for tools that are to be decontaminated. Tools **SHALL NOT** be removed from Rack A except for decon or with RP Group permission. Equipment placed on this rack should not be deconned unless specific instructions are supplied and the individual responsible has tagged the parts.

11.4.2 Decontaminated Items to be Cleared by RPS

The rack labeled "Decontaminated Items to be Cleared by RPS" is for tools that have been decontaminated and are in the process of being smeared and cleared by an RPS. Tools **SHALL NOT** be removed from this shelf without the approval of the duty RPS.

11.4.3 Clean Items for General Use

The rack labeled "Clean Items for General Use" is for clean tools that can be removed for storage or reuse.

11.5 Contaminated Tool Control

11.5.1 Containment Tools

Workmen who use tools from the containment tool rack should return them to the rack after work completion and wipe them down unless stated otherwise on the Radiation Work Permit. All tools that require removal from containment should be placed outside containment in the area marked "Tools to be Cleared". If a worker requires special control of a tool or piece of equipment, it is his responsibility to mark the part. This tag should include the special precaution and the individual responsible.

11.5.2 Tools and Equipment in Other Contaminated Areas

A. It is the responsibility of the individual using the tools and equipment in contaminated areas to check with the duty RPS for the proper method of tool clearance and specific instructions concerning decontamination.

B. It is the responsibility of the individual worker to tag materials requiring special control. He must ensure his name and/or special instructions are on the tag.

C. If the work area is highly contaminated, it is the RPS's responsibility to oversee bagging, transporting, and decontamination of contaminated material. This may be accomplished by special instructions on the RWP or by personal control.

11.5.3 Tools to be Decontaminated

A. The NPSA (Nuclear Plant Services Attendant) will remove the equipment and:

1. Frisk and separate equipment according to the amount of contamination.

2. Decontaminate the lowest contaminated equipment first and the highest last.

3. Decontaminated tools will be placed in the rack "Decontaminated Items to be Cleared by RPS".

B. The RPS should survey for loose and fixed contamination. The tools that are clean will be placed on the rack "Clean Items for General Use".

If tools are removed from Rack C for use in the Hot Shop, they **SHALL NOT** be placed back in Rack B or C; they will be placed in Rack A for decontamination.

11.5.4 Precautions

A. Personnel who use headsets in contaminated areas should make every feasible attempt to keep them off the floors.

B. If you suspect contamination on a headset, have it evaluated by an RPS.

11.5.5 Equipment Removal from the Radiologically Controlled Area

All tools and equipment **SHALL** be checked by an RPS for smearable contamination and fixed contamination prior to removal from the Radiologically Controlled Area. The smearable limit is 100 dpm/100cm^2 $\beta\gamma$ and 10 dpm/100 cm^2 α and the fixed limit is 100 cpm above background on a GM frisker when frisking at 1 to 3 inches per second.

It is not necessary to count all smears for alpha activity; representative numbers of smears will suffice.

A. Equipment is normally smeared to check for loose contamination and passed through the Tool Monitor to check for fixed contamination.

B. Personal items (hard hats, clip boards, pens, note books, etc.) that have not been taken into a Contaminated Area and that stay in possession of the owner can be removed from the RCA by passing though the Friskall with the individual. Wear the items in normal fashion or hold them up to the detectors while using the Friskall.

C. All personnel are responsible for their own material left at Access Control for release from the RCA. IF it is not possible to wait for the item to be cleared, THEN arrangements should be made with the RP Group (i.e., a phone number placed on the item that you may be reached at when the item is cleared). Any items (including those that have been cleared) not removed from Access Control in a timely manner (normally that same day) will be removed by the NPSA Group and taken to a storage location or trashed.

12.0 PROCEDURES FOR HANDLING LARGE RADIOACTIVE SPILLS

Large radioactive spills can result in personnel contamination and can present airborne radioactivity problems. A general procedure for handling spills is outlined below:

12.1 The individual discovering a spill **SHALL**:

12.1.1 Evacuate the area immediately.

12.1.2 Contact the Control Room and supply all information available on the emergency.

12.1.3 Remain near the area and keep all personnel out until the Shift Supervisor arrives at the scene.

12.2 The Shift Manager or unaffected unit's Shift Supervisor should:

A large spill could also be affecting unit operation. The Shift Supervisor(s) may be needed in the Control Room.

12.2.1 Go to the affected area and evaluate the emergency. Refer to F3-2, Emergency Classification.

12.2.2 Protective clothing will be required in the general area of the spill which is available in the emergency supplies and the Anti-C Clothes Storage Area.

NOTE:	**Wear plastic outer clothing with hood and use a full face respirator with a high efficiency particulate air filter.**

12.2.3 Call Radiation Protection personnel for assistance as necessary.

12.2.4 Confine the spill with barricades, ropes, locked doors, etc., and keep personnel out of the affected area.

12.2.5 Assist any contaminated personnel with decontamination.

12.2.6 Watch for airborne radioactivity, utilizing continuous air monitors and grab samples. If the hazard is not completely evaluated, take all precautions to protect emergency team members by requiring them to wear self-contained breathing equipment besides the plastic outer clothing.

12.2.7 The first step in decontamination is directing water over the area from outside to a drain if possible (this removes the larger portion of loose contamination). If this is not possible, cover the spill with absorbent paper or mop up the spill.

12.2.8 After initial hosing, apply procedures for floor and equipment decontamination as described in Section D13, Decontamination.

12.2.9 Watch exposures of all personnel assisting in the decontamination.

12.2.10 With assistance from Radiation Protection, clean the area toward a central location (usually a drain) and move barricades after smear surveys indicate satisfactory decontamination.

12.2.11 Observe step-off areas and monitor all personnel.

13.0 ENTRANCE INTO THE RESIN DISPOSAL BUILDING AND THE WASTE STORAGE AREA

The Resin Disposal Building and the Waste Storage yard are controlled areas. People entering these areas **SHALL** have dosimetry as per the RWP for the area. Entrance should be made from the Auxiliary Building.

At times, areas outside the plant may be controlled areas (roped off). Entrance into these areas should be made under an RWP with appropriate dosimetry.

Personnel should not enter the Auxiliary Building from the outside doors except with RPS approval and an RWP or in case of an emergency.

14.0 PRAIRIE ISLAND UNBORN CHILD PROTECTION PROGRAM

14.1 Background

Generally, cells that are reproducing rapidly are more susceptible to radiation damage. Such is the case with the human embryo. Furthermore, there is evidence that the embryo/fetus is particularly radiosensitive during the first 2 to 3 months after conception, when a woman may not be aware that she is pregnant.

In light of this situation, the National Council on Radiation Protection (NCRP) has recommended the dose equivalent to the unborn child from occupational exposure of the mother be limited to 500 mrem for the term of the pregnancy. In response to the recommendation, the Nuclear Regulatory Commission (NRC), in its Standards for Protection Against Radiation (10CFR20), provides the following rights to females:

- It is the right of a female, who declares in writing that she is pregnant, to have her occupational exposure during the term of the pregnancy limited to 500 mrem and to have the exposure fairly evenly distributed over that time.

- It is the right of a pregnant female to not have her exposure limited during the pregnancy if she chooses.

- It is the right of a declared pregnant female to change her status from "declared" to "undeclared" at any time.

14.2 Prairie Island Unborn Child Protection Program

To ensure the health and safety of the unborn child, as well as the rights of pregnant females, Prairie Island has developed the Unborn Child Protection Program (UCPP).

The main points of the program are:

- All females who enter the Prairie Island Restricted Area (inside double security fences) on any frequency or who are employed on the Prairie Island site are eligible for the 100% voluntary UCPP.

- All eligible females who are planning a family or who are pregnant are encouraged to take advantage of the UCPP by declaring so in writing. If the female is planning a family and wishes to enter the program an additional notification is required when pregnant so that the dose to the unborn child can be tracked.

- Upon entering the UCPP, occupational dose will be limited to 50 mrem per month or 450 mrem for the entire gestion period, whichever is more limiting, such that the total dose during the term of the pregnancy does not exceed the NRC limits (500 mrem for term of pregnancy).

- Prairie Island is required by NRC rules to track the dose to each unborn child of declared pregnant females. Therefore, when each pregnancy is terminated, the declared pregnant female should undeclare the pregnancy so the dose to the child can be determined. After termination of a pregnancy, if a person wishes to remain on the UCPP for the purposes of another pregnancy, another declaration must be made.

- The declared pregnant female's supervisor will be notified of the lower exposure limits so that alternative work assignments can be made, if necessary, to reduce, or where possible, to eliminate exposure.

- Furthermore, all declared pregnant females who enter the Restricted Area (double security fence) **SHALL** report to Access Control and be issued a TLD badge. A base line wholebody count will also be conducted when declaring pregnancy.

To enter the UCPP, contact the Plant Nurse (ext. 4080) or Julie Furchner (ext. 4346) or a Radiation Protection Specialist (ext. 4346). They will assist you with completing the written declaration and with questions you may have.

Additional information on the topic of prenatal radiation exposure may be found in Regulatory Guide 8.13, which was handed out during General Employee Training (GET). Questions may also be directed to Al Johnson, General Superintendent of Radiation Protection and Chemistry (ext. 4443) or Pete Wildenborg, Sr. Plant Health Physicist (ext. 4379), or Julie Furchner (ext. 4346).

15.0 ATTACHMENTS

NONE

SEO Jpm A.3

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Recognize and make preparations for emergency containment entry | Job Performance Measure No: A.3

K/A Reference: 2.3.10 [2.9/3.3]

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance _X_ Actual Performance __ Classroom _X_ Simulator __ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 is operating at 25 % power with power increase in progress.
- An alarm on Fire Protection Panel FP121 indicates there is a fire in Zone 20.
- R-11 and R-12 are alarming on-scale.
- Containment temperature is 92° F and rising.

Task Standard: Recognize the need for an emergency containment entry and prepare a list of all the requirements for a emergency containment entry with R-11 and R-12 alarming on scale. All the items listed as critical steps and a total of eight of the nine items listed on the key must be provided for a satisfactory response.

Required Materials: F-2, "Radiation Safety," Rev. 22, F-5,"Fire Fighting," Appendix A, Rev. 8

General References: F-2, "Radiation Safety," Rev. 22, F-5,"Fire Fighting," Appendix A, Rev. 8

Initiating Cues:

- The SM has directed you to list all the restrictions, requirements, and actions that must be met to allow the fire brigade access to the affected zone.

Time Critical Task: YES/NO | Alternate Path: YES/NO

Validation Time: __20_ Minutes | Time Started _____ | Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__1__ Performance step: SAT/UNSAT

DETERMINE what is impacted by a fire in Zone 20

Standard:

Evaluators Note: Candidate may already know that Zone 20 is inside the containment.

Review F5 Appendix A to determine that Zone 20 is the Unit 1 containment building.

Comment:

CUE: If asked provide the candidate a copy of F5 Appendix A, Rev.8

.

__2__ Performance step: SAT/UNSAT

DETERMINE that an emergency containment entry is necessary for containment access.

Standard:

Candidate finds and reads F-2, "Radiation Safety," Rev. 22. Step 9.3.2, "Emergency Entry is defined as non-routine entry for inspection or operation such as a fire alarm..."

Comment:

CUE: If asked provide the candidate a copy of F-2, "Radiation Safety," Rev. 22.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__3__ Performance step: **Critical Step** SAT/UNSAT

F-2, "Radiation Safety," Rev.22. Step 9.1.2, "Containment entry is NOT permitted during reactor startup or during reactivity changes while the reactor is critical.

Standard:

Candidate finds and reads F-2, "Radiation Safety," Rev.22, and determines that the power increase must stop.

Comment:

CUE: If asked provide the candidate a copy of F-2, "Radiation Safety," Rev.20.

___4___ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev. 22. Step 9.2

Specific requirements for containment entry while at hot standby and power are spelled out in these procedures.

F-2, "Radiation Safety," Rev. 22. Step 9.2.1, The entry team SHALL be equipped with dosimeters, TLD's, and a beta-gamma survey instrument.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None

___5___ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev. 22. Step 9.2.3, Prior to containment entry, contact the Shift Supervisor to confirm the following:

A. There is not flux mapping or incore detector movement in progress. Very high radiation dose rates and possible overexposures can be caused by the incore detectors.

B. The Shield buiding ventilation systems are secured.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___5__ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev. 22. Step 9.2.4, If the unit is above cold shutdown, one shield building door at each entry **SHALL** be closed at all times.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

___6__ Performance step: **CRITICAL STEP** **SAT/UNSAT**

F-2, "Radiation Safety," Rev. 22. Step 9.2.5, Before entry, a pre-job briefing SHALL be conducted with those entering and Control Room personnel, as appropriate. This pre-job briefing SHALL include a discussion of all tour/work locations and anticipated radiation levels (PINGP 1112)

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__7__ Performance step: **CRITICAL STEP** SAT/UNSAT

F-2, "Radiation Safety," Rev. 22. Step 9.2.6, All personnel entering the containment SHALL check in with the Control Room, or the designated person at the airlock, if posted.

When contacting Control Room prior to Containment entry at power, ensure all, personnel are wearing a TLD and Electronic Dosimeter (ED) and the ED is turned on (number and mRem indicated with the window).

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

__8__ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev. 22. Step 9.2.7, All personnel should use discretion when temperatures are above 85 degrees. The guidelines for heat stress in the NSP PINGP Safety Manual should be reviewed. Backup teams and stay times may be required.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___9__ Performance step: **CRITICAL STEP** **SAT/UNSAT**

F-2, "Radiation Safety," Rev. 22. Step 9.3.2, B. If R-11 and R-12 of the appropriate Unit are:

1. Not alarming and normal readings, entry may be made without any respiratory protection.

2. **Alarming on scale, entry may be made with the use of a MSA Ultralite II.**

3. Alarming off scale, no entry may be made without the Supt. Rad Protection or designee appraisal and approval.

Standard:

Candidate determines that this requirement (2) applies and documents by listing on the sheet provided.

Comment:

CUE: If asked inform the candidate that R11 and R 12 are alarming **on** scale.

___10__ Performance step: SAT/UNSAT

F-2, "Radiation Safety," Rev.22, Step 9.3.2.C, observe the requirements of the Radiation Work Permit.

Standard:

Candidate determines that this requirement applies and documents by listing on the sheet provided.

Comment:

CUE: None.

Terminating cue: When the candidate determines that all F-2 requirements are listed.

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 is operating at 25 % power with power increase in progress.
- An alarm on Fire Protection Panel FP121 indicates there is a fire in Zone 20.
- R-11 and R-12 are alarming on-scale.
- Containment temperature is 92° F and rising.

Initiating Cues:

- The SM has directed you to list all the restrictions, requirements, and actions that must be met to allow the fire brigade access to the affected zone.

Requirements

KEY

Requirements	
1.	Stop Power Increase
2.	Entry team equipped with TLD's, Dosimeters, and a beta-gamma survey instrument.
3.	Contact SS and verify that no flux mapping or incore detector movement is in progress and that shield building ventilation is secured.
4	If in Mode 1 then one shield building door at each entrance must be closed.
5.	Pre-job brief
6.	Check in w/control room and verify TLD & ED is on
7.	When containment temperatures are above 85° review guidelines in safety manual.
8.	MSA Ultralite II required for entry
9.	Follow RWP requirements.

Key

F2	RADIATION SAFETY	NUMBER: F2
		REV: 22

INFORMATION USE

- *Procedure may be performed from memory.*
- *User remains responsible for procedure adherence.*
- *Procedure should be available, but not necessarily at, the work location.*

O.C. REVIEW DATE:	OWNER:	EFFECTIVE DATE
4-1-02 SC	A. Johnson	4-1-02

F2	RADIATION SAFETY	NUMBER: F2
		REV: 22

TABLE OF CONTENTS

1.0 ALARA

1.1 General Discussion

The objective for all Radiation Safety practices at Prairie Island is to keep radiation exposures to plant workers and the general public "As Low as Reasonably Achievable" - ALARA. The ALARA goals are (1) to maintain the annual dose to individual employees as low as reasonably achievable and (2) to keep the annual integrated dose for all station workers as low as reasonably achievable (i.e., total station Person-REM ALARA). All personnel on site **SHALL** be responsible for ALARA. The design and operation of the ISFSI (Independent Spent Fuel Storage Installation) **SHALL** fall under the plant's ALARA program. The details of the ALARA Program are contained in Radiation Protection Implementing Procedure, RPIP-1004.

The Management of Prairie Island and NMC are and have been committed to safety and ALARA. ALARA is now required by 10CFR20.1101(b): "The licensee **SHALL** use to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)." Therefore, all plant personnel should continually look at means to maintain radiation exposure ALARA.

1.2 Radiation Sources

There are two main sources of radiation to personnel at Prairie Island. The largest source of radiation is from the activation of corrosion products. Corrosion products are formed in the Reactor Coolant System and activated when they pass through or are deposited in the reactor core neutron field. The major source term for dose from corrosion products is the isotope Cobalt-60. Cobalt materials are typically used where hard wear surfaces are desired. Any wear or corrosion of these surfaces will result in the release of the cobalt material which will become activated in the reactor and later settle on out of core surfaces. The corrosion products will be deposited in low flow areas or crevices; such as, drain valves, instrument tap-offs, in the gap in socket welds, and pipes with low flow section.

The other largest contributor to radiation fields is the fission products that are formed when the nuclear fuel fissions. These fissions products leak from the fuel into the Reactor Coolant System and are transported about the plant systems.

1.3 Plant Operations to Minimize Doses

Below is a listing of practices that are used to minimize the transport of corrosion products from the fuel to ex-core areas and limit the resulting doses to plant personnel.

1.3.1 The Reactor Coolant System is operated with dissolved hydrogen in the water which helps maintain a slightly basic, reducing chemistry environment.

1.3.2 The oxygen levels in the Reactor Makeup Water Systems are minimized.

1.3.3 Purification of the RCS is maximized during outages, shutdowns, and startups. Resin choices are optimized during outage and non-outage times to ensure the best practical cleanup efficiency.

1.3.4 The power rate changes are minimized to help reduce the amount of fission products that are released to the RCS. The reactor return to power rates are established to prevent fuel damage by conditioning the fuel.

1.3.5 If fuel leaks are detected, the fuel is sipped during the refueling outage to prevent putting leaky elements back into the core without being repaired.

1.3.6 Crud traps and hot spots are flushed to remove the radioactive material and lower the dose rates.

1.4 Plant Design and Modification That Minimize Radiation Doses

Prairie Island was designed to minimize radiation doses. Equipment with large source terms was placed in vaults to help minimize doses to personnel. Piping and tanks that carry or store highly radioactive materials were shielded or routed through areas that have high dose rates. The Spent Resin Tank and the Waste Gas Tanks were placed in cubicles and cemented shut to prevent access.

Several modifications have been made that have helped reduce the doses at Prairie Island such as Containment Cleanup Fans suction routed to the SG primary manways for ventilation during the EC testing to the SGs; the grids on the fuel have been changed from inconel to zircalloy because of the cobalt in the inconel; a permanently installed purification system was installed as part of the CVCS system for when the plant is shutdown; and robotics are now used for EC testing of the SGs.

1.5 ALARA Reviews of Modifications

The plant Radiation Protection Staff has been given the responsibility of reviewing all modification within the Radiological Controlled Area. The RP staff has generated a checklist (PINGP 758) that should be used by engineers in the designing of systems and changes to present systems. This checklist should be used in the design phase so that elements of the program can be incorporated into modifications. A figure of $15,000 per Person-REM should be used for purposes of cost benefit analysis.

1.6 ALARA Reviews as Part of Work Control Process

1.6.1 The plant System Engineers should keep the Radiation Protection group informed of major tasks that involve their systems. The work tasks should be discussed by Work Supervisors, Work Planners, Plant Management, Engineers, workers, and the Radiation Protection Group. These discussions should center on the work procedures and means by which the radiation exposure can be minimized.

As part of the RWP generation process, the Radiation Protection Specialist should look at each job to assure that radiation exposures are ALARA.

When appropriate, post work reviews should be conducted to see where further reductions are possible in case the job will be repeated or where a similar concept can be used on other jobs.

1.6.2 The RPIPs of the Radiation Protection Manual describes the RWP requirements and procedures for routine high dose/dose rate jobs.

1.6.3 The General Superintendent of Radiation Protection, as a member of the Operations Committee, **SHALL** consider minimizing radiation exposure and radioactive waste generation when reviewing procedures as part of the Operations Committee.

1.6.4 Engineers performing design changes on the plant **SHALL** consider ALARA practices (PINGP 758) during the design and installation of plant equipment. ALARA principles **SHALL** also be included in work procedures (WR's) and in PM procedures.

1.6.5 When ordering new or replacement parts for equipment associated with the primary systems (CVCS, RCS, reactor internals, and steam generators), the System Engineer should specify low cobalt materials.

1.6.6 Operations **SHALL** consider minimizing radiation exposures and radioactive wastes during operations including isolating and draining equipment for maintenance.

1.6.7 Maintenance and contract labor **SHALL** minimize radiation exposure while working in the plant. Examples of what should be done are: (1) Minimizing time in radiation areas; (2) Utilize existing shielding or request additional shielding as needed; (3) Where not physically necessary, stand away from radiation sources as much as possible; (4) Work with the radiation protection personnel to minimize exposure.

1.6.8 The scheduling of work activities should be consistent with ALARA for minimizing radiation exposures.

1.6.9 The Radiation Protection Group **SHALL** review work for ALARA considerations. The ALARA Program describes considerations to be made with regard to ALARA review. Any work activity that can result in a total dose of 1 Person-REM should have a detailed ALARA review. This review should be concentrating on methods to reduce the dose, which should include mockups, trial runs, shielding, procedure and design review, and other complications of the work.

1.6.10 Engineering controls **SHALL** be used to the extent practical to minimize airborne radioactivity and the use of respiratory protection. Work generally can be accomplished faster when respirators are not worn.

1.6.11 On large work activities, the Radiation Protection Group should be contacted early to provide input in the procedures and design. The Radiation Protection Group is informed of upcoming work via the Operations Committee meetings, scheduling meetings, and engineers asking for assistance.

1.6.12 Radiation dose fields can be reduced by maintaining good chemistry control on the Reactor Coolant System. The boron to lithium should be kept within the band recommended by Westinghouse. The hydrogen concentration should be maintained properly. The reactor should be operated conservatively to maintain the integrity of the fuel.

The chemistry of the secondary system and other systems **SHALL** be monitored to minimize the potential corrosion damage to these systems. This can prevent failures, reduce maintenance, and reduce radiation exposures.

1.6.13 The plant **SHALL** be maintained as clean as possible to reduce radiation levels and contamination levels in the plant. By maintaining clean areas, less dose and rad waste are generated for maintenance and construction activity. Cleaning and deconning of equipment can save exposure by allowing work without respirators. However, consideration should be given to the potential dose for deconning and not deconning and the method giving the least dose should be chosen.

1.6.14 The high quality of maintenance and preventative maintenance of plant equipment is an ALARA tool. By maintaining equipment in proper working order, leaks and failures will be minimized which greatly reduces exposures.

1.6.15 All badged plant personnel (excluding office personnel) **SHALL** have training on keeping exposures and rad waste ALARA.

1.7 Source Term Reduction Program

A major item in a plant ALARA program is to maintain as low dose rates in the plant as possible. What we want to do is keep the source of radiation as low as reasonably achievable. This procedure describes in general terms the program to reduce the radiation sources.

1.7.1 Fuel Integrity

The major radioactive source available in the plant is the fuel. By maintaining the integrity of the fuel we keep that source of radiation in a controlled location. The fuel integrity control program assures that the plant is operated to maintain fuel integrity.

We must maintain controls on RCS activity to be sure that we sip fuel during the next refueling outage whenever any fuel leakage is in progress. If a major fuel defect is indicated by high alpha activity or high cesiums, ceriums, or rutheniums in the RCS, an evaluation must be made to determine if a mid cycle shutdown is needed for fuel inspection. The fact that major plant problems will develop if fuel damage is allowed inspires us to shutdown if there is an indication of fuel damage.

If there is fuel leakage but not major fuel damage, no significant dose rate increases will be observed in areas like the S/G channel heads; but there will be significant increases in the VCT, Ion Exchangers, and Waste Gas System areas. Airborne activity from iodines will be a problem.

1.7.2 Chemistry

Chemistry controls have a major impact on the dose rates in the plant. The Reactor Coolant System chemistry is controlled according to a coordinated Lithium-Boron regime which is consistant with fuel vendor recommendations and industry best practices.

If fuel cladding failure causes elevated RCS activities, steps will be taken to minimize the effect on plant dose rates.

1.7.3 RCS Purification

The CVCS Purification Systems are operated to the maximum extent practical both during operation and during outages.

Our shutdown and startup practices are modeled on industry standard methods to help limit the transport of activated corrosion products from the core to the ex-core areas.

1.7.4 Scheduling

The timing of various work can have a large impact on the dose received for that job. The scheduling department is experienced at scheduling work in the plant when the dose rate in the areas is the lowest. For example, the work in the RHR pit is done right before a shutdown as that is the lowest dose rate time for that area.

1.7.5 Maintenance

The maintenance is done with housekeeping in mind. This cleanup after maintenance work keeps much of the filings and particulate out of the RCS. Cleanliness means that when lapping is done the piping is vacuumed out and wiped out. It also means that the design of modifications and installations has keeping foreign materials out of the RCS of prime importance.

1.7.6 Modifications

ALARA reviews (PINGP 758) are part of the design change process. This review assures that materials of construction are such that cobalt input to the RCS is minimized. It also assures that construction practices are such that crud traps are minimized. Shielding is included in the design as appropriate. We look at long term plant dose in the design change process.

1.7.7 Flushing

Hot spots on various piping and drain lines are monitored for high radiation. If an area has elevated radiation levels that can be reduced by flushing, an evaluation is made that will determine if the flush can be done.

Another method of removing hot spots is to do tank cleaning. This is normally done by using a sludge type pump to pump the sludge to a spent resin liner or to a 55 gal drum. The amount of sludge that builds up is minimized by using filters in the floor drains.

1.7.8 Decontamination

We do extensive decontamination to reduce source terms. An example is the cavity decon which is done to reduce the source of radiation and also to reduce the airborne source term.

2.0 GENERAL REQUIREMENTS

2.1 Description

This section of the Operations Manual contains the radiation safety rules and procedures applicable to all personnel on site. Other specific radiation protection procedures and requirements applicable to Radiation Protection Personnel appear in Radiation Protection Implementing Procedures (RPIP's) of the Radiation Protection Manual, Count Room Manual, Computer Manual, and Chemistry Manual.

2.2 Responsibilities

The following categorizes radiation protection responsibilities of various groups:

2.2.1 Individuals

The individual **SHALL** have the following radiation protection responsibilities:

A. Comply with the rules established in this section of the Operations Manual.

B. Frequently check ED dose (every 30 minutes in non-radiation areas, 15 minutes in radiation areas, every 5-10 minutes in high radiation areas). As an individual's dose approaches the ED alarm setpoint, the ED should be checked more frequently and exit the area prior to reaching the alarm setpoint.

C. Read carefully and observe all requirements as spelled out on applicable Radiation Work Permits (RWP's) or as displayed on the Electronic Dosimeter Log-In screen.

D. Take special care to assure they are free of detectable contamination before leaving the Radiologically Controlled Area (RCA) and the Restricted Area.

E. Observe and ensure understanding of radiological postings.

F. Correctly record their exposure upon leaving the (RCA) as necessary.

G. Keep exposure ALARA by refraining from lingering in radiation fields, by maximizing distance from radiation source, by utilizing existing shielding, and by reviewing work procedures and conducting as much preliminary work outside radiation areas as feasible.

H. Report all wounds and skin contamination received while in the RCA.

I. Provide feedback to Supervisors and Radiation Protection Group on ways to reduce exposure.

J. Minimize radioactive waste by removing materials from packages prior to entry into the RCA and by minimizing materials taken into contaminated areas.

K. Auxiliary Building Floor Drains - Only materials considered nonhazardous and approved in accordance with the current NPDES permit, may be released to the radioactive waste treatment system. Contact the Radwaste System Engineer, Environmental Compliance Coordinator or designee for material disposal instructions in the Auxiliary Building. Refer to D14.5, Hazardous and Nonhazardous Material Storage, Disposal and Labeling Requirements, for disposal, storage and labeling requirements.

L. Verify barrier or barricade (swing gate, rope, door) is CLOSED or back in place after entering or exiting a HRA or LHRA.

M. Refrain from eating, drinking, smoking or chewing (gum, tobacco, toothpicks, etc.) in the RCA (Radiologically Controlled Area – includes Aux Bldg, Containments, Rad Waste Bldg, Resin Disposal Bldg, Rad Waste Storage Bldg or special areas setup on site). Special areas may be set up in the RCA to allow drinking or eating as designated by the General Supt RP and Chem.

N. Wear electronic dosimeter and TLD within a hand's width of each other on the upper body (chest area), or as exempted by the RWP.

O. In addition to the above requirements, abide by the following Generic RWP requirements:

1. **COMPLY** with the RWP and Access Computer Log-in Screen requirements.
2. **ENSURE** proper dosimetry is worn (TLD and dosimeter, minimum) and verify ED is turned ON.
3. **CONTACT** Duty RPS prior to entering the RCA (each entry and prior to changing job scope). Routine watchstanding is exempt from this requirement.
4. **BE** knowledgeable of work area dose rates (including hot spots) and minimize dose using time, distance and shielding.
5. **ABSOLUTELY** no entry into "Radiographing Areas".
6. **UPON** observing a radiological alarm (Electronic dosimeters, area monitor, or CAM) immediately evacuate the area and contact the RP Group.
7. **OBSERVE special requirements for High Radiation Area entry; KEEP locked doors locked except for entry.**
8. Prior to cutting, welding, grinding, burning, sanding, buffing or anything that will disturb contamination, **CONTACT** RP Group to determine contamination levels.
9. **OBSERVE** radiological postings and barriers. Postings and barriers can only be moved under the direction of Radiation Protection Group. Ensure all entrance barriers are in place after each entry/exit.
10. **OBTAIN** RP survey and approval prior to removing items from the RCA (Radiologically Controlled Area).
11. **HAVE** Radiation Protection present when removing any items from any fuel pool.
12. DO NOT **MOVE** or reposition any shielding.
13. **CONTACT** the Containment RPS each entry.
14. **MONITOR** for contamination using the Friskall upon leaving the RCA.

15. **CONTACT** RP Group prior to entering areas eight (8) feet above the floor (with the exception of areas with permanent ladders). Areas eight (8) feet above the floor are not routinely surveyed.

2.2.2 Supervisor

Each Supervisor **SHALL** have the responsibility to:

A. Ensure their workers obey the rules spelled out in this section and the instructions on Radiation Work Permits (RWP's).

B. Oversee individual exposures received and authorize exposure of personnel based on present and future work requirements.

C. Assist Radiation Protection in pre-work training exercises designed to reduce work exposure.

D. Assure their workers are covered under the protective requirements of a Radiation Work Permit (RWP) when working in posted areas and the RCA.

E. Attempt to keep their workers' exposure ALARA by reviewing work procedures.

F. Ensure their workers minimize the amount of radioactive waste produced by removing packaging materials from components prior to entry into the RCA.

G. Ensure their workers process oil and solvents as per D55, Hazardous Waste.

2.2.3 Radiation Protection Group

The responsibilities of the Radiation Protection Group are spelled out in 5AWI 3.1.0 and in the RPIPs (Radiation Protection Implementing Procedures).

2.2.4 Engineering Personnel

Engineers and Work Planners **SHALL** be aware of radiation exposure concerns while writing design changes and WR packages keeping in mind the ALARA concept.

2.2.5 Corporate Radiation Protection Support Group

The Corporate Radiation Protection Support Group is responsible for review and assessment of the plant's radiation protection program. They provide suggestions for improvements to the program as well as assessments to report to management on program effectiveness. They also are responsible for monitoring other industry events and regulatory activity in the radiation protection area to provide input to improve the plant radiation protection program.

2.3 Radioactive Waste Management

M This section is in this procedure to address an ANI concern. Radioactive Waste Management at Prairie Island is the responsibility of the Radiation Protection Group. Normally an engineer is assigned to keep track of solid waste generation, storage, and shipping schedules. The Radiation Protection Group will direct the packaging and procedures for shipping rad waste off site. They will write the required procedures and work requests for solid waste management. Radwaste Engineering personnel also monitor and direct the processing and handling of liquid and gaseous rad waste systems. They are responsible to communicate their flow path direction to the Operations Department.

3.0 AREA CONTROL

3.1 Definitions

3.1.1 Barrier/Barricade

Device used to prevent inadvertent access to a High Radiation Area.

3.1.2 Restricted Area

An area where access is limited by the licensee to protect individuals from exposure to radiation or radioactive materials. This is the area inside the double security fenced area including the double fence area for the plant and the Independent Spent Fuel Storage area (ISFSI).

3.1.3 Controlled Area

An area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason. This is the area inside the area fence along County 18 and outside the Restricted Area.

3.1.4 Radiologically Controlled Area (RCA)

A Radiologically Controlled Area is any area to which access is limited and controlled for the purpose of managing occupational radiation exposure. This normally includes the Auxiliary, Radwaste and Resin Disposal Buildings and the area of the ISFSI inside the double fence area, excluding the double fence area.

3.1.5 Posted Area

Areas where contamination levels are above the applicable limit have a boundary or barrier of yellow and magenta rope or tape or areas where radiation levels are above the applicable limit are posted (radiation sign) or have a boundary or barrier and boundary of yellow and magenta rope or tape if part of a contaminated area. Yellow and magenta rope (tape, ribbon) should not be used for non-radiological purposes. These areas **SHALL** be posted, according to their respective requirements, with one or more magenta and yellow signs bearing a radiation symbol and the wording: CAUTION, RADIATION AREA; CAUTION or DANGER, HIGH RADIATION AREA; GRAVE DANGER, VERY HIGH RADIATION AREA; CAUTION, AIRBORNE RADIOACTIVITY AREA; CAUTION RADIOACTIVE MATERIALS AREA; or CAUTION, CONTAMINATED AREA.

3.1.6 Unrestricted Area

An area to which access is not limited or controlled by the licensee. This is the area outside the Controlled Area which is bordered by the fence along County Road 18.

3.2 Radiation and Contamination Limits

3.2.1 Unrestricted Area

All operations **SHALL** be conducted so the levels of radiation in unrestricted areas and the concentrations of radioactive material in effluents to unrestricted areas **SHALL** be within the limits set forth in 10CFR20.

3.2.2 Radiation Areas

A Radiation Area is an area accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 30 cm (12") from the radiation source. These areas **SHALL** be conspicuously posted with a sign bearing the radiation symbol and the word, "CAUTION, RADIATION AREA".

3.2.3 High Radiation Areas

Definition - An area, accessible to personnel, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 mrem in one hour at 30 cm (~12") from the radiation source. An area with a radiation field of 100 mrem/hr or greater and less than 1000 mrem/hr at 30 cm (~12") from the source **SHALL BE CONSIDERED** a High Radiation Area. These High Radiation Areas **SHALL** be posted and barricaded. The barricade can consist of a rope or chain or swing arm across the entrance. Barricade **SHALL** be verified in place after entry or exit of area. The posting **SHALL** bear the radiation symbol and the words "DANGER" (or "CAUTION") "HIGH RADIATION AREA."

Entry Requirements - Entry **SHALL BE CONTROLLED** by the issuance of a Radiation Work Permit.

A. Individuals qualified in radiation protection procedures (RPS, contract RPS) or personnel continuously escorted by a person qualified in radiation protection procedures **MAY BE EXEMPT** from the RWP issuance requirement during the performance of their assigned duties.

B. Any individual or group of individuals permitted to enter High Radiation Areas **SHALL BE PROVIDED** with one or more of the following:

1. a radiation monitoring device which continuously indicates the radiation dose rate, such as; a Mini-Rad or RO-2/2A;

   or,

2. a device that continuously integrates the dose rate in the area and alarms when a preset integrated dose is received, such as; an Electronic Dosimeter. Entry into such areas with this device **SHALL** be made only after the dose rate levels have been established and personnel are aware of them;

   or,

3. an individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and **SHALL** perform periodic radiation surveillance at the frequency specified by the radiation protection manager.

3.2.4 Locked High Radiation Area

Definition - An area accessible to personnel in which the radiation levels **ARE** greater than or equal to 1000 mrem/hr at 30 cm (~12"). T.S.6.7.B (**IT.S.5.7.2**) **REQUIRES** that High Radiation Areas where the dose rate is equal to or exceeds 1000 mrem/hr and less than 500 rad/hr **SHALL BE LOCKED** or **GUARDED** and access to these areas **SHALL BE CONTROLLED**. The keys to these areas **SHALL BE CONTROLLED** administratively by the Plant Manager. Doors **SHALL** remain locked except during periods of access by personnel under an approved RWP. The area **SHALL** be posted with a sign bearing the radiation symbol and the words "DANGER" or "LOCKED HIGH RADIATION AREA".

Entry Requirements - Entry **SHALL BE CONTROLLED** by the issuance of a Radiation Work Permit that specifies the dose rate levels in the immediate work area and the maximum allowable stay time.

A. Individuals qualified in radiation protection procedures (RPS, contract RPS) or personnel continuously escorted by a person qualified in radiation protection procedures may be exempt from the RWP issuance requirement during the performance of their assigned duties.

B. In lieu of the stay time specified on the RWP, a specified dose limit for entry into the area may be specified. This normally will be done with the electronic dosimeter and will be more limiting than the stay time as the dose limit will be individual specific.

C. In lieu of the stay time specified on the RWP, direct or remote (such as closed circuit TV or transmitting radiation monitoring device) continuous surveillance may be made by personnel qualified in radiation protection procedures to provide positive control over the activities being performed within the area.

D. If the Locked High Radiation Area is in a large building, such as the containment, and it cannot be locked or guarded and it is not feasible to construct an enclosure around the area, the area **SHALL BE BARRICADED**, and **CONSPICUOUSLY POSTED** and a flashing warning light **SHALL BE ACTIVATED** as a warning device.

3.2.5 Several areas within each plant have high radiation levels (>10 rem/hr) that don't meet the requirements of a Very High Radiation Area, but yet the dose rates are high enough that additional controls should be taken for these areas. They are:

A. the reactor cavity area while at power,

B. the reactor coolant loop vault area during power operation (N-16 initiated dose rates of 10 to 100 rem/hr),

C. the Spent Resin Tank area,

D. the ion exchangers used in the CVCS and spent fuel pool cooling systems, and

E. Containment during flux mapping with incore instrumentation.

1. Access to these areas requires a special key and permission from the General Superintendent of Radiation Protection and Chemistry.

2. Stay times for these areas **SHALL** be specified on the RWP.

3.2.6 **Very High Radiation Areas**

A Very High Radiation Area is an area accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at one meter (3') from the radiation source. Very High Radiation Areas **SHALL** be barricaded and conspicuously posted with the radiation symbol and the words, "GRAVE DANGER, VERY HIGH RADIATION AREA". Two areas of each plant are considered Very High Radiation Areas, the Fuel Transfer Tube Area and the Sump C (Thimble Chase) area. The Fuel Transfer Tube Areas have a poured cement shield but they also have a cement block access opening which has a wire cage to prevent access. Access to these areas requires the permission of the Plant Manager. Keys **SHALL** only be issued to members of the RP Group. Access to these areas **SHALL NOT** be allowed without measures taken to reduce the dose rates in the areas; such as, pushing the thimble tubes into the reactor vessel or stopping fuel handling respectively. 5AWI 5.3.0, Key Control, contains the procedure for obtaining the key.

3.2.7 Airborne Radioactivity Area

Any area in which airborne radioactive materials exist in concentration in excess of 30% of the DAC limit as tabulated in Appendix B, Table 1, Column 1 of 10CFR20, **SHALL** be conspicuously posted with a sign or signs bearing a radiation symbol and the words, "CAUTION" (or "DANGER") "AIRBORNE RADIOACTIVITY AREA." All exposed surfaces in an Airborne Radioactivity Area are assumed to be contaminated.

3.2.8 Contaminated Area

Any area accessible to personnel in which surface contamination exists above 10 dpm/100 cm^2 alpha and/or 100 dpm/100 cm^2 beta-gamma as determined by smear tests, should be barricaded or roped and conspicuously posted with the radiation symbol and the words, "CAUTION, CONTAMINATED AREA".

It is permissible to reach across contaminated area boundaries without touching items. Rubber, surgeon, or work gloves should be worn to touch items.

3.2.9 Radioactive Materials Area

Any area accessible to personnel in which there exists radioactive material in an amount which exceeds 10 times Appendix C, 10CFR20 **SHALL** be conspicuously posted with the radiation symbol and the words, "CAUTION, RADIOACTIVE MATERIALS AREA."

3.3 Access Control

The following are requirements for access in to the RCA:

3.3.1 All personnel are required to follow the requirements of a Radiation Work Permit while in the RCA.

3.3.2 Normally only one manned access control point is permitted to control entry into the RCA. Entries other than this point **SHALL** be cleared with the Shift Manager and the General Supt. of RP and Chemistry.

3.4 Radiation Work Permit (RWP)

3.4.1 All entries into the RCA require the use of an RWP (Radiation Work Permit). The RWP is a method of communicating and controlling the radiological precautions necessary to ensure safe work practices.

3.4.2 Instructions and requirements in RWPs **SHALL** be followed by all personnel.

3.4.3 A copy of the RWP is located at Access Control.

3.4.4 All personnel **SHALL** be aware of the requirements of the RWP covering their activity and be familiar with the radiological conditions for the area.

3.4.5 The Radiation Protection Group should notify workers of major changes in the RWP. This is normally accomplished by a revision which requires reading the RWP while logging on the computer login screens.

3.4.6 The personnel using the RWP should verify the description of work on the RWP is accurate.

3.4.7 Personnel should carefully read the protective clothing requirements and ensure they understand the requirements.

4.0 PERSONNEL PROTECTION AND CONTROL

4.1 Indoctrination

All personnel on site, other than escorted visitors, are indoctrinated in radiological safety, security, emergencies, fire protection, etc. as described in 5AWI 3.11.0.

4.2 Radiation Exposure

4.2.1 Internal Dose

The amount of internal dose received at Prairie Island is very low and is normally not a problem. Dose to internal organs is called Committed Dose Equivalent, CDE. It is the 50 year committed dose to an organ due to intake of radioactive material whether the intake is from inhalation, ingestion or absorption.

The internal dose to an organ is equated to external dose using Weighting Factors, WF. The Weighting Factors are assigned to individual organs based on the risk to that organ when equated to the total risk from external dose. The internal dose to an organ (CDE) is multiplied by the Weighting Factor (WF) to obtain the Committed Effective Dose Equivalent, CEDE. CEDE is the internal dose portion of total dose. One rem of external dose is equal to one rem of CEDE internal dose.

4.2.2 External Dose

External dose can be dose to the wholebody, skin, extremities and lens of the eye.

External wholebody dose is called Deep Dose Equivalent (DDE) and is normally measured by TLDs.

External dose to the skin is called Shallow Dose Equivalent, Wholebody (SDE,WB) and is normally measured by the TLDs. The SDE,WB is limited to 50 rem per year. Prairie Island has established an administrative dose guideline of 20 rem per year.

External dose to the extremities is called Shallow Dose Equivalent, Extremities (SDE,E) and is normally measured by special issue extremity badges. The SDE,E is limited to 50 rem per year and Prairie Island has established an administrative dose guideline of 20 rem per year.

Dose to the Lens of the eye is called Lens Dose Equivalent, LDE, and is normally measured by the TLD. The LDE is limited to 15 rem per year. Prairie Island has established an administrative dose guideline of 6 rem per year.

4.2.3 Total Dose

There are two total dose limits that are in effect at Prairie Island, Total Organ Dose Equivalent (TODE) and Total Effective Dose Equivalent (TEDE).

Total Organ Dose Equivalent (TODE) is the sum of DDE and CDE and indicates the total dose to an organ. TODE **SHALL** be limited to 50 rem per year. Prairie Island has established administrative guideline of 20 rem per year. This guide can be increased with management approval.

Total Effective Dose Equivalent (TEDE) is the sum of Deep Dose Equivalent (DDE) and Committed Effective Dose Equivalent (CEDE). TEDE **SHALL** be limited to 5 rem per year. Prairie Island has established administrative dose guideline of 2 rem per year. This guide can be increased with management approval.

4.2.4 Dose to Minors

The yearly dose limits to minors are 10% of the above dose limits (0.5 rem TEDE; 5 rem TODE; 1.5 rem LDE; and 5 rem SDE,WB and SDE,E). The administrative dose guidelines to minors are also 10% of the adult administrative dose guidelines.

4.2.5 Dose to Embryo/Fetus

The dose to the embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant female, **SHALL NOT** exceed 0.5 rem. The dose to the embryo/fetus is the sum of the Deep Dose Equivalent (DDE) to the declared pregnant female and the dose to the embryo/fetus from radionuclides in the embryo/fetus and the declared pregnant female. Efforts **SHALL** be made to avoid substantial variation above a uniform monthly exposure rate. Prairie Island has established an administrative dose guideline of 50 mrem per month or 450 mrem for the entire gestation period, whichever is more limiting. Details of dose control to the embryo/fetus is contained in Section 14.0 of F2.

4.3 Personnel Exposure Control (Plant Administrative Controls)

Periodically, supervisors should review the exposure history for their workers. This information should then be used for work assignments. During outages, the Radiation Protection Group should provide exposure records to all group supervisors.

Visitors are allowed access to the RCA provided they do not enter a High Radiation Area or Very High Radiation Area.

Further exposure control techniques are specified in the Radiation Protection Implementing Procedures.

4.4 Personnel Monitoring Techniques

4.4.1 External Monitoring

Electronic dosimeters (EDs) and thermoluminescent dosimeters (TLDs) **SHALL** be worn on the upper area of the body (chest) within one hand's width of each other or as exempted by RWP.

External monitoring is accomplished using TLD (Thermoluminescent dosimeter), electronic dosimeters, direct reading dosimeters, and neutron TLD's. Official exposure is obtained from the vendor TLD results for DDE (whole body), SDE,WB (skin of whole body) LDE (lens of eye), SDE,E (extremity) and from vendor neutron TLD's for whole body. (RPIP's contain further instruction for the Radiation Protection Specialists on this topic.)

4.4.2 Internal Monitoring

Internal monitoring for gamma emitting radioisotopes is accomplished by passive monitoring on the Friskall monitors. Additional whole body counts are obtained as specified in RPIPs.

4.5 Personnel Contamination Control

The following are methods employed at Prairie Island to protect personnel from radioactive contamination and to monitor for contamination.

4.5.1 Protective Clothing

The use of protective clothing and the proper procedure for exiting a posted area with a step-off pad for both single suit and double suit protection is outlined in the Anti-C Clothing Removal Procedure section of F2.

4.5.2 Personnel Contamination Check

All personnel who exit the site should normally pass through the exit portal monitor located in the guardhouse. All personnel who exit the Aux Bldg **SHALL** pass through the portal monitor at Access Control and the Friskall monitor or personnel frisking at Access Control. IF work requires alternative exit, THEN obtain RP Supervisor approval and frisking requirements. If any of these monitors are out of service, the Radiation Protection Supervisor or designee **SHALL** determine the appropriate personnel monitoring at Access Control.

A. Frisking of hands, feet, and suspect areas **SHALL** be performed per RWP at closest available frisker prior to putting on personnel clothing.

1. Slowly (about 3 inches per second) move both hands close to the frisking probe and check hand not contaminated (clean) prior to picking up probe. Listen for an increase in the count rate and stop the probe if the count rate increases. The Frisker probe should be within ½ " of the body surface and it is permissible to touch the probe against the article being frisked.

2. Slowly frisk to ensure free of contamination. Pay particular attention to the exposed areas of the body and areas that may have rubbed against surfaces, such as the knees, arms, or back.

3. Frisk the dosimeters and TLD if they were worn outside the protective clothing.

4. If the alarm on the frisker sounds or the count rate has increased on any part of the body, contact the RP group for assistance. If there is no one at the area that can contact the RP group, suit up in the clean Anti-C's and proceed to Access Control.

4.5.3 Contamination Monitoring Equipment

The following outlines the use of equipment to assure contamination control:

A. G-M Ratemeters (Friskers) - Eberline RM-14 count rate meters equipped with shielded pan-cake probes are located at strategic locations. They are used for body frisking after anti-C removal in cases where the individual suspects body contamination or as required on the RWP. The friskers are very inefficient if they are not moved slowly over the body; the maximum speed should not exceed 3 inches per second.

B. Hand & Foot Monitor - A Hand & Foot Monitor may be located at the containment step-off pad area. Personnel should follow locally mounted instructions for proper use of the monitor.

C. Sensitive plastic scintillation detector portal (Gamma-60) monitors are located at Access Control and at the Guardhouse. The detector response time is less than one second, therefore, it is not necessary to stop while walking through the monitor.

If the monitor alarms, reset the alarm, ensure the green light is on, back away from the monitor, then walk through again. If the portal alarms the second time, contact the Rad Protection Group.

D. A highly sensitive "Friskall" booth type monitor is located at Access Control. It can replace the Frisker as a total body contamination monitor. The counting time for the front of a person is started by pressing and holding a foot pedal until the front count is complete as indicated by the second "beep". Personnel should hold their hands up to the detectors during the front and back counts to ensure good monitoring of the hands. The person then **SHALL** turn around and activate the count on the back of the body by pressing and holding the foot pedal until the back count is complete as indicated by the second "beep". If a person is contaminated, the monitor will alarm and an RPS should be contacted to aid in decontamination.

4.5.4 Personnel Decontamination

Contact the Radiation Protection Specialist for assistance if you detect contamination on yourself. Personnel decontamination procedures are described in detail in the RPIPs. In almost all cases, washing or showering is a sufficient method of decontamination.

4.6 Access Control Procedures

4.6.1 Personnel who enter the RCA are required to log-in on the Access Control Computer System or on the Access Control Cards as directed by the RP Group. The computer screen display of the RWP satisfies the requirements of reading the RWP.

4.6.2 When exiting the RCA, all personnel **SHALL** go through the Friskall portal monitor or frisk as defined by the RP Supervisor or designee.

4.6.3 When exiting the RCA, personnel should record their dosimeter reading by logging out on the Access Control Computer System or as directed by the RP Group.

4.7 Hot Particle (Speck) Program

General Discussion

With the advent of new high sensitive portal and booth type monitors, many nuclear plants have been able to detect very discrete particles (invisible to the naked eye) with high specific activity. At some plants the hot particles are fission products with very high beta energies. At Prairie Island we have only seen Cobalt-60 hot particles which have low beta energies, but high dose rates which can cause very high doses in localized areas.

At Prairie Island we have modified the work process around fuel pool water to require extra protective clothing for removing materials from the pool water and for laying on the floors. We also conduct Masslinn (oil cloth) surveys in fuel pool areas and routinely throughout the plant.

A special dose assessment procedure will be conducted for people who do get hot particles on their skin.

5.0 EQUIPMENT CONTROL

The purpose of equipment control is to prevent the spread of radioactive material and contamination into clean or uncontrolled areas and to minimize dose. Refer to Control of Radioactive Materials of this procedure for contaminated tool and equipment control.

Conditional Release to the Clean Area (white tag)

Radioactive equipment used in the Radiologically Controlled Area (RCA) may be conditionally released from the RCA provided it is under the control of the Radiation Protection Group. Normally, radiation levels resulting in greater than 2 mR/hr whole body exposure should require area control. Equipment should be tagged with a white tag which may not be removed while the equipment is in the Clean Area. A log is maintained at Access Control for equipment removed from the Controlled Area.

6.0 RADIOACTIVE MATERIAL HANDLING

Procedure for handling radioactive material such as waste shipments, source handling, radioactive effluents, fuel receipt, equipment decontamination, etc., appears in appropriate C, D, and G sections of the Operations Manual and the RPIPs.

7.0 RADIATION OCCURRENCES

7.1 General

A course of action is required to deal with radiation occurrences. This is necessary for evaluation of compliance with licenses and regulations, and to determine the adequacy of the radiation protection program. Outlined below are the criteria and reporting requirements and the course of action necessary.

7.2 Criteria for Judging Radiation Occurrences

Radiation occurrences are normally events involving radioactive materials or contamination. They are events not normally expected and, therefore, not normally anticipated. They can result from rule violations and carelessness. In general, they consist of:

7.2.1 Unexpected contamination (personnel and area)

7.2.2 Unexpected radiation exposures or electronic dosimeter dose alarms

7.2.3 Unexpected internal uptake of radioactive material

7.2.4 Unauthorized radioactive material releases to the environment

7.2.5 Unexpected radioactive material released in the plant

7.2.6 Loss of radioactive material

The Corrective Action Process is used for more serious problems, such as 7.2.2 - 7.2.6.

7.3 Reporting Radiation Occurrences

Each individual **SHALL** have the responsibility to report detected radiation occurrences to the Radiation Protection Group. Condition Reports may be submitted and a direct call to the Lead RPS @ 4475 can be performed.

7.4 Action Required

Immediate emergency action may be necessary as described in the Emergency Plan, Section F3-2. Follow-up action is required by the General Superintendent of Radiation Protection and Chemistry (GSRP&C). With the assistance of the Radiation Protection Group, he **SHALL** evaluate the radiation occurrence as rapidly as possible and determine what additional action may be necessary.

A Condition Report **SHALL** be filled out for all genuine occurrences. The General Supt. Radiation Protection and Chemistry **SHALL** ensure assessments of these Condition Reports are performed.

8.0 RESPIRATORY PROTECTION

Purpose and Policy Statement

Airborne radioactive materials within the plant are maintained below the Derived Airborne Concentration (DAC) whenever practicable by use of process engineering controls, containment ventilation, and portable ventilation filter units.

It is necessary, however, that some work be performed in respirators in confined or localized areas of high airborne activity such as steam generator nozzle dam installation, reactor cavity decon, cutting into radioactive systems, or repairing radioactive equipment.

Respiratory protective equipment allows the required work in some airborne situations to be accomplished with greater safety and lower exposure to radioactive materials than by not using respiratory protective equipment. Further details of the Respiratory Protection Program are defined in the RPIPs and H-26.

9.0 CONTAINMENT ENTRY PROCEDURE

9.1 General Discussion

Containment entries are NOT allowed during flux mapping with the reactor critical. The following procedure outlines the measures necessary for containment entry during Mode 2, Hot Standby (**IT.S. Startup**) and Mode 1, Power Operation.

9.1.1 Containment entry during Mode 6, Refueling, Mode 5, Cold Shutdown, Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**), and Mode 3, Hot Shutdown (**IT.S. Hot Standby**) are controlled by the issuance of RWPs in conjunction with RPIP-1729; Initial Containment Entry.

9.1.2 Containment entry is NOT permitted during reactor startup or during reactivity changes while the reactor is critical.

9.1.3 All entries during Mode 2, Hot Standby (**IT.S. Startup**) and Mode 1, Power Operation **SHALL BE MADE** by more than one person and normally a Radiation Protection Specialist should accompany the entering party.

9.1.4 Entries by a single individual are permitted during Mode 3, Hot Shutdown (**IT.S. Hot Standby**), Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**), and Mode 5, Cold Shutdown based on a supervisory review of work hazards. The work area thermal conditions should be considered when allowing individual entries.

There are two parts to this procedure; normal entry into Mode 1, Power Operation and Mode 2, Hot standby (**IT.S. Startup**) and emergency entry into Mode 1, Power Operation and Mode 2, Hot standby (**IT.S. Startup**). Emergency entry is defined as an entry which is not controlled by the Radiation Protection Group.

9.2 Requirements

Specific requirements for containment entry while in Mode 2. Hot Standby (**IT.S. Startup**) and Mode 1 Power Operation are spelled out in these procedures.

9.2.1 The entry team **SHALL** be equipped with dosimeters, TLD's, and a beta-gamma survey instrument.

9.2.2 Entry into the RC loops and Reactor Cavity **SHALL NOT** be permitted without permission from the Superintendent of Radiation Protection and Chemistry or his designee.

9.2.3 Prior to containment entry, contact the Shift Supervisor to confirm the following:

A. There is not flux mapping or incore detector movement in progress. Very high radiation dose rates and possible overexposures can be caused by the incore detectors.

B. The Shield Building Ventilation Systems are secured.

9.2.4 IF the Unit is in one of the following Modes:

Mode 1, Power Operation

OR

Mode 2, Hot Standby (**IT.S. Startup**)

OR

Mode 3, Hot Shutdown (**IT.S. Hot Standby**)

OR

Mode 4, Intermediate Shutdown (**IT.S. Hot Shutdown**)

THEN one shield building door at each entry **SHALL** be closed at all times.

9.2.5 Before entry, a pre-job briefing **SHALL** be conducted with those entering and Control Room personnel, as appropriate. This pre-job briefing **SHALL** include a discussion of all tour/work locations and anticipated radiation levels (PINGP 1112).

9.2.6 All personnel entering the containment **SHALL** check in with the Control Room, or the designated person at the airlock, if posted.

When contacting Control Room prior to Containment entry at power, **ensure** all personnel are wearing a TLD and Electronic Dosimeter (ED) and the ED is turned on (number and mRem indicated within the window).

9.2.7 All personnel should use discretion when temperatures are above 85 degrees. The guidelines for heat stress in the Safety Manual should be reviewed. Backup teams and stay times may be required.

9.2.8 When all personnel are out of the containment, the personnel and maintenance airlock hatches **SHALL** be locked.

9.2.9 Post-job brief required.

9.3 Procedure

9.3.1 Normal Entry into Mode 1, Power Operation and Mode 2, Hot standby (IT.S. Startup)

This procedure is for routine inspection, operation, and work.

A. Refer to the general requirements in this procedure Section 9.2.

B. Verify the internal cleanup fans are operating 24 hours prior to entry, if necessary.

NOTE:	**Based on R-11 and R-12 containment air monitors, and based on recent air samples, air sampling may not be required.**

C. Contact the Radiation Protection Group at least 6 hours before the entry for an air sample.

D. The Radiation Protection Group should draw samples and analyze for the following:

1. Particulate Activity
2. Gaseous Activity
3. Iodine
4. Tritium

E. Observe the requirements of the Radiation Work Permit.

9.3.2 Emergency Entry into Mode 1, Power Operation and Mode 2, Hot standby (IT.S. Startup)

Emergency entry is defined as non-routine entry for inspection or operation such as a fire alarm or a limit switch position check.

A. Refer to the general requirements in this procedure Section 9.2.

B. If R-11 and R-12 of the appropriate unit are:

1. Not alarming and normal readings, entry may be made without any respiratory protection.

2. Alarming on scale, entry may be made with the use of a MSA Ultralite II.

3. Alarming off scale, no entry may be made without the Supt. Rad Protection or designee appraisal and approval.

C. Observe the requirements of the Radiation Work Permit.

10.0 ANTI-C CLOTHING AND REMOVAL PROCEDURE

10.1 General Discussion

This procedure is designed to familiarize all personnel with the preferred procedure to use when removing single and double sets of Anti-C clothing at SOP's. The intent of proper clothing removal is to keep personnel free of contamination, keep contamination in a controlled area, and keep the SOP itself clean. Some circumstances will arise calling for better protection by wearing rubber suits and air fed suits. In these situations, the Rad Protection Group should be available to help with the unsuiting process.

The general intent of clothing removal at a multiple SOP is to remove the most contaminated item first, normally the outer gloves. Then the outer head protection and respiratory protection; if worn, should be removed. The coveralls should then be removed followed by outer footwear while stepping onto the SOP.

10.2 Protective Clothing

The main purpose of protective clothing is to prevent personnel contamination of the skin. In some cases the protective clothing also prevents skin exposure from beta radiation.

Cotton liners **ARE NOT** considered protective clothing and **SHALL NOT** be worn without additional protection.

The different types of protective clothing are specified on the RWP or RWP Log-In Screen (Access Computer Log-In system). They include "Bootie and Glove Suit-up", "Lab Coat Suit-up", "Normal Full Suit-up", "Normal Full Suit-up - Sealed", "Double Suit-up - Paper", "Double Suit-up - Plastic", and "Special Suitup".

The "Normal Full Suit-up" can be specified with or without sealing. If sealing is specified, the tape or elastic band or Velcro band should be applied to the rubber glove (work glove) and coverall junction, and the bootie and coverall junction. "Sealing" means the use of tape or elastic bands or velcro straps where "taping" means only the use of tape. Double suit-ups will always require the use of tape. Tape may also be used at the liner and coverall junction to prevent liner removal with the outer glove.

Rubber gloves should be used whenever working with a wet surface or when working on the internals of a radioactive system. Cloth (canvas) glove may be for all other situations.

10.2.1 The "Bootie & Glove Suit-up" includes some type of protective foot cover and rubber gloves or work gloves or surgeons gloves. This suit-up should not be used in congested areas where activities are likely to cause contact between contaminated surfaces and skin or clothing. This suit-up requires RPS approval (as per RWP).

10.2.2 "Lab Coat Suit-up" includes a lab coat, rubber gloves or surgeons gloves, and some type of protective foot cover. This suit-up requires RPS approval (as per RWP).

10.2.3 "Normal Full Suit-up" includes coveralls, surgeons cap or hood, (discretionary) cotton liners with rubber gloves or work gloves or surgeons gloves, and booties and rubbers or booties and shoe covers. Normally a hood is worn when a respirator is required. This suit-up does not normally require taping or sealing. If sealing is required it will be specified after the type suit-up.

10.2.4 "Double Suit-up - Paper" includes all of the items specified for a "Normal Full Suit-up" as the inner set of PCs (Protective Clothing) and then an additional full suit-up including rubber gloves, paper coveralls, hood, and an extra pair of protective foot covers. A double suit-up always requires taping of the arm and leg junctions.

10.2.5 "Double Suit-up - Plastic" includes all of the items specified for "Normal Full Suit-up and then an additional full suit-up including rubber gloves, plastic coveralls, hood (normally air fed hood for personal comfort), and an extra pair of protective foot covers. The double suit-up always requires taping of the arm and leg junctions. An RPS will normally help personnel into and out of this type of suit-up.

10.2.6 "Special Suit-up" - This suit-up will be developed to meet the needs of special job situations.

10.3 Procedure

10.3.1 Single Set Anti-C's Removal

This procedure is written for a full single set of Anti-C's as described in the General Discussion and used at a single SOP other than the containment SOP. The last thing to be removed prior to stepping onto a SOP is the protective clothing on the feet.

The only suit-up clothing a person should have on while standing on the SOP is cotton or nylon liners.

The following procedure should be followed to minimize the spread of contamination:

A. Approach the SOP area, remove the tape or elastic band, if necessary, around the rubber gloves and place tape in waste cart.

B. Remove the rubbers on the feet and deposit in the clothing cart.

C. Remove the rubber gloves inside out and place in the clothing cart.

D. Carefully remove the hood if worn, by opening the seam at the chin, pull both sides around to the back of the head, and deposit in the clothing cart.

E. Remove the respirator, if worn, by pulling up and back on the chin piece. Place respirator in clean poly bag.

F. Carefully remove surgeons cap if worn, by leaning forward or back towards the container and deposit in the clothing cart.

G. Remove tape or elastic strap on outside of legs, if necessary.

H. If dosimetry is worn in outside pocket, remove and place on personal neck lanyard.

I. Remove the coveralls inside out by slipping over shoulders; remove TLD and dosimeter and put on frisker cart (if worn on coveralls); continue removing coveralls and place in clothing cart.

J. Remove one foot bootie and place that foot down on the SOP and place bootie in proper clothing cart. Remove the other foot bootie and place that foot down on the SOP and place the bootie in the proper clothing cart.

K. Remove the glove liner and place in the clothing cart.

L. Monitor as required by the RWP.

10.3.2 Double Anti-C Removal

A. This section is written in general terms for the removal of the outer set of clothing at the first SOP encountered when exiting an area. The inner set of clothing is removed as per the above "Single Set Anti-C Removal" procedure. This procedure is written in general terms as many types of double suitups may be encountered. Suit-ups more complicated than this will normally require direct RPS assistance.

B. Remove the outer set of gloves.

C. Remove outer head protection and respirator, if worn.

D. Remove outer set of coveralls.

E. Remove one outer shoe cover and step onto SOP in one continuous motion.

F. Remove the other outer shoe cover and step onto SOP in one continuous motion.

G. Proceed to second SOP and remove inner set of clothing as per single set Anti-C removal.

11.0 CONTROL OF RADIOACTIVE MATERIALS AND RAD WASTE

11.1 Purpose

The purpose of this instruction is to provide guidelines for minimizing radioactive waste and establish a definite procedure for control of contaminated tools and equipment. This procedure is designed to maximize the control of contaminated equipment and minimize personnel inconvenience and exposure.

11.2 Precaution

Read all signs on tool and equipment racks prior to touching or removing equipment. When in doubt, contact an RPS.

11.3 Minimizing Radioactive Waste

Disposal of radioactive waste is very expensive, labor intensive, and uses limited waste disposal site capacity. The cost to dispose of a roll of tape is greater than the original cost of the tape. Therefore, exceptional efforts should be taken to minimize the generation of radioactive waste.

11.3.1 Packing materials should not be taken into the RCA.

11.3.2 Waste should be segregated at the source as defined by the RP Group.

11.3.3 Launderable protective clothing should be used as much as possible.

11.4 General Discussion

This instruction is written to help solve many of the problems associated with control of contaminated tools and equipment.

Three large storage racks have been established for control of radioactive equipment in the Hot Machine Shop Area.

11.4.1 Items to be Decontaminated (Rack A, 695 Decon Area)

The rack labeled "Items to be Decontaminated" is for tools that are to be decontaminated. Tools **SHALL NOT** be removed from Rack A except for decon or with RP Group permission. Equipment placed on this rack should not be deconned unless specific instructions are supplied and the individual responsible has tagged the parts.

11.4.2 Decontaminated Items to be Cleared by RPS

The rack labeled "Decontaminated Items to be Cleared by RPS" is for tools that have been decontaminated and are in the process of being smeared and cleared by an RPS. Tools **SHALL NOT** be removed from this shelf without the approval of the duty RPS.

11.4.3 Clean Items for General Use

The rack labeled "Clean Items for General Use" is for clean tools that can be removed for storage or reuse.

11.5 Contaminated Tool Control

11.5.1 Containment Tools

Workmen who use tools from the containment tool rack should return them to the rack after work completion and wipe them down unless stated otherwise on the Radiation Work Permit. All tools that require removal from containment should be placed outside containment in the area marked "Tools to be Cleared". If a worker requires special control of a tool or piece of equipment, it is his responsibility to mark the part. This tag should include the special precaution and the individual responsible.

11.5.2 Tools and Equipment in Other Contaminated Areas

A. It is the responsibility of the individual using the tools and equipment in contaminated areas to check with the duty RPS for the proper method of tool clearance and specific instructions concerning decontamination.

B. It is the responsibility of the individual worker to tag materials requiring special control. He must ensure his name and/or special instructions are on the tag.

C. If the work area is highly contaminated, it is the RPS's responsibility to oversee bagging, transporting, and decontamination of contaminated material. This may be accomplished by special instructions on the RWP or by personal control.

11.5.3 Tools to be Decontaminated

A. The NPSA (Nuclear Plant Services Attendant) will remove the equipment and:

1. Frisk and separate equipment according to the amount of contamination.

2. Decontaminate the lowest contaminated equipment first and the highest last.

3. Decontaminated tools will be placed in the rack "Decontaminated Items to be Cleared by RPS".

B. The RPS should survey for loose and fixed contamination. The tools that are clean will be placed on the rack "Clean Items for General Use".

If tools are removed from Rack C for use in the Hot Shop, they **SHALL NOT** be placed back in Rack B or C; they will be placed in Rack A for decontamination.

11.5.4 Precautions

A. Personnel who use headsets in contaminated areas should make every feasible attempt to keep them off the floors.

B. If you suspect contamination on a headset, have it evaluated by an RPS.

11.5.5 Equipment Removal from the Radiologically Controlled Area

All tools and equipment **SHALL** be checked by an RPS for smearable contamination and fixed contamination prior to removal from the Radiologically Controlled Area. The smearable limit is 100 dpm/100cm^2 $\beta\gamma$ and 10 dpm/100 cm^2 α and the fixed limit is 100 cpm above background on a GM frisker when frisking at 1 to 3 inches per second.

NOTE:	**It is not necessary to count all smears for alpha activity; representative numbers of smears will suffice.**

A. Equipment is normally smeared to check for loose contamination and passed through the Tool Monitor to check for fixed contamination.

B. Personal items (hard hats, clip boards, pens, note books, etc.) that have not been taken into a Contaminated Area and that stay in possession of the owner can be removed from the RCA by passing though the Friskall with the individual. Wear the items in normal fashion or hold them up to the detectors while using the Friskall.

C. All personnel are responsible for their own material left at Access Control for release from the RCA. IF it is not possible to wait for the item to be cleared, THEN arrangements should be made with the RP Group (i.e., a phone number placed on the item that you may be reached at when the item is cleared). Any items (including those that have been cleared) not removed from Access Control in a timely manner (normally that same day) will be removed by the NPSA Group and taken to a storage location or trashed.

12.0 PROCEDURES FOR HANDLING LARGE RADIOACTIVE SPILLS

Large radioactive spills can result in personnel contamination and can present airborne radioactivity problems. A general procedure for handling spills is outlined below:

12.1 The individual discovering a spill **SHALL**:

12.1.1 Evacuate the area immediately.

12.1.2 Contact the Control Room and supply all information available on the emergency.

12.1.3 Remain near the area and keep all personnel out until the Shift Supervisor arrives at the scene.

12.2 The Shift Manager or unaffected unit's Shift Supervisor should:

A large spill could also be affecting unit operation. The Shift Supervisor(s) may be needed in the Control Room.

12.2.1 Go to the affected area and evaluate the emergency. Refer to F3-2, Emergency Classification.

12.2.2 Protective clothing will be required in the general area of the spill which is available in the emergency supplies and the Anti-C Clothes Storage Area.

NOTE:	**Wear plastic outer clothing with hood and use a full face respirator with a high efficiency particulate air filter.**

12.2.3 Call Radiation Protection personnel for assistance as necessary.

12.2.4 Confine the spill with barricades, ropes, locked doors, etc., and keep personnel out of the affected area.

12.2.5 Assist any contaminated personnel with decontamination.

12.2.6 Watch for airborne radioactivity, utilizing continuous air monitors and grab samples. If the hazard is not completely evaluated, take all precautions to protect emergency team members by requiring them to wear self-contained breathing equipment besides the plastic outer clothing.

12.2.7 The first step in decontamination is directing water over the area from outside to a drain if possible (this removes the larger portion of loose contamination). If this is not possible, cover the spill with absorbent paper or mop up the spill.

12.2.8 After initial hosing, apply procedures for floor and equipment decontamination as described in Section D13, Decontamination.

12.2.9 Watch exposures of all personnel assisting in the decontamination.

12.2.10 With assistance from Radiation Protection, clean the area toward a central location (usually a drain) and move barricades after smear surveys indicate satisfactory decontamination.

12.2.11 Observe step-off areas and monitor all personnel.

13.0 ENTRANCE INTO THE RESIN DISPOSAL BUILDING AND THE WASTE STORAGE AREA

The Resin Disposal Building and the Waste Storage yard are controlled areas. People entering these areas **SHALL** have dosimetry as per the RWP for the area. Entrance should be made from the Auxiliary Building.

At times, areas outside the plant may be controlled areas (roped off). Entrance into these areas should be made under an RWP with appropriate dosimetry.

Personnel should not enter the Auxiliary Building from the outside doors except with RPS approval and an RWP or in case of an emergency.

14.0 PRAIRIE ISLAND UNBORN CHILD PROTECTION PROGRAM

14.1 Background

Generally, cells that are reproducing rapidly are more susceptible to radiation damage. Such is the case with the human embryo. Furthermore, there is evidence that the embryo/fetus is particularly radiosensitive during the first 2 to 3 months after conception, when a woman may not be aware that she is pregnant.

In light of this situation, the National Council on Radiation Protection (NCRP) has recommended the dose equivalent to the unborn child from occupational exposure of the mother be limited to 500 mrem for the term of the pregnancy. In response to the recommendation, the Nuclear Regulatory Commission (NRC), in its Standards for Protection Against Radiation (10CFR20), provides the following rights to females:

- It is the right of a female, who declares in writing that she is pregnant, to have her occupational exposure during the term of the pregnancy limited to 500 mrem and to have the exposure fairly evenly distributed over that time.

- It is the right of a pregnant female to not have her exposure limited during the pregnancy if she chooses.

- It is the right of a declared pregnant female to change her status from "declared" to "undeclared" at any time.

14.2 Prairie Island Unborn Child Protection Program

To ensure the health and safety of the unborn child, as well as the rights of pregnant females, Prairie Island has developed the Unborn Child Protection Program (UCPP).

The main points of the program are:

- All females who enter the Prairie Island Restricted Area (inside double security fences) on any frequency or who are employed on the Prairie Island site are eligible for the 100% voluntary UCPP.

- All eligible females who are planning a family or who are pregnant are encouraged to take advantage of the UCPP by declaring so in writing. If the female is planning a family and wishes to enter the program an additional notification is required when pregnant so that the dose to the unborn child can be tracked.

- Upon entering the UCPP, occupational dose will be limited to 50 mrem per month or 450 mrem for the entire gestion period, whichever is more limiting, such that the total dose during the term of the pregnancy does not exceed the NRC limits (500 mrem for term of pregnancy).

- Prairie Island is required by NRC rules to track the dose to each unborn child of declared pregnant females. Therefore, when each pregnancy is terminated, the declared pregnant female should undeclare the pregnancy so the dose to the child can be determined. After termination of a pregnancy, if a person wishes to remain on the UCPP for the purposes of another pregnancy, another declaration must be made.

- The declared pregnant female's supervisor will be notified of the lower exposure limits so that alternative work assignments can be made, if necessary, to reduce, or where possible, to eliminate exposure.

- Furthermore, all declared pregnant females who enter the Restricted Area (double security fence) **SHALL** report to Access Control and be issued a TLD badge. A base line wholebody count will also be conducted when declaring pregnancy.

To enter the UCPP, contact the Plant Nurse (ext. 4080) or Julie Furchner (ext. 4346) or a Radiation Protection Specialist (ext. 4346). They will assist you with completing the written declaration and with questions you may have.

Additional information on the topic of prenatal radiation exposure may be found in Regulatory Guide 8.13, which was handed out during General Employee Training (GET). Questions may also be directed to Al Johnson, General Superintendent of Radiation Protection and Chemistry (ext. 4443) or Pete Wildenborg, Sr. Plant Health Physicist (ext. 4379), or Julie Furchner (ext. 4346).

15.0 ATTACHMENTS

NONE

FIRE DETECTION ZONE 20
FIRE AREA 1

FIRE DETECTION ZONE 20

FIRE AREA(S): 1 LOCATION: Reactor Building, Unit 1, El. 715'

EMERGENCY LIGHTING: Yes

TYPE OF FIRE: Cable - Oil - Charcoal Filters - Misc.

PERSONNEL HAZARDS:
Contamination due to possible high airborne activity present
When above cold S/D: Hose stations depressurized
Fire extinguishers removed
All liquids and gaseous releases will remain in containment

COMMUNICATIONS:
Sound powered phone jackboxes
Dial telephone

FIRE EQUIPMENT:
Hose stations
CO_2 & dry chemical fire extinguishers

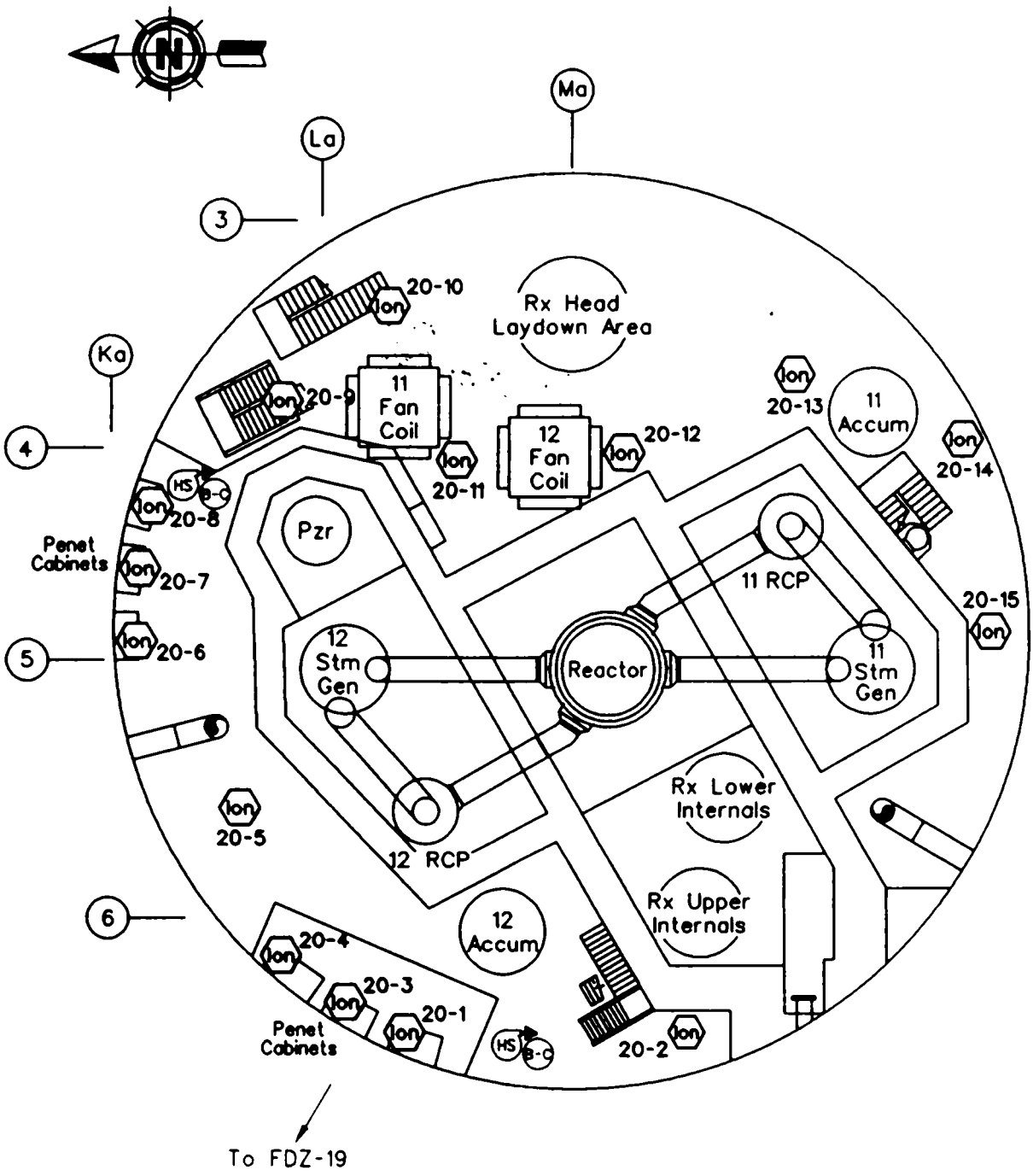
EQUIPMENT CONTROL:
Process instrumentation; RHR

SECURE REACTOR BUILDING VENTILATION & COOLING SYSTEMS
Containment Dome Recirculation Fans
Fan Coil Units
Reactor Gap Fans
CRDM Cooling Fans
Containment Clean-up Fans
Emergency Pressurization of Containment Firemain:

1. Go to reset on CS-46080 for valves CV-39405 & 39407 on Control Room Panel A (Clg. Water).
2. At Unit 1 chilled water panel in Unit 2 Turbine Building go to open on CS-57330-08 for #11 CRDM Shroud Isolation valves.
3. Open two 4 inch gate valves in Unit 1 Containment by Personnel Air Lock. See print Detection Zone 29.

SPECIAL INSTRUCTIONS:
Smoke removal via in-service purge system Portable extinguishers
"SCBAs" required if high airborne activity is present

SUMMARY:
Refer to fire Detection Zone 10



Unit 1 Reactor Bldg
Flr El. 711'-6"

FIRE DETECTION ZONE20
Fire Area 1

CAD FILE: Z20F13

RO JPM A 4

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island Task No: _____

Task Title: Emergency NRC Notification Job Performance Measure No: RO A.4

K/A Reference: K/A 2.4.12 [3.4/3.9]

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance _X_ Actual Performance __ Classroom __ Simulator ___ Plant _X_

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

A General Emergency was declared 33 minutes ago. The NRC Operations Center has not yet been notified.

Task Standard: The candidate must demonstrate that he/she understands the capability to call the NRC operations center on a commercial telephone line.

Required Materials: Copy of PINGP 666, Rev. 17.

General References: F3-4, "Responsibilities During An Alert, Site Area, or General Emergency"

Initiating Cues:

The Unit 2 SS directs you to make an immediate emergency notification phone call to the NRC operations center due to a declaration of a General Emergency 33 minutes ago.

Time Critical Task: YES/NO Alternate Path: YES/NO

Validation Time: 10 Minutes Time Started _____ Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__1__ Performance step: SAT/UNSAT

OBTAIN PINGP Form 666.

Standard:

Candidate understands that a prepared form exists and needs to be completed prior to contacting the NRC.

Comment:

CUE: When the candidate asks for a copy of PINGP Form 666 provide a pre-filled out copy.

.

__2__ Performance step: **CRITICAL STEP** SAT/UNSAT

SIMULATE contacting the NRC Operations Center.

Standard:

Provide the evaluator with one of the commercial numbers for calling the NRC Ops Center from the top of PINGP Form 666 and simulate calling the NRC Ops Center within 27minutes of being assigned this task.

Comment:

Cue: **BEFORE** the candidate picks up the Red Phone inform the candidate that the phone does not work. **DO NOT LET THE CANDIDATE PICK UP THE RED PHONE.**

Terminating cue: When the candidate provides the commercial number to the evaluator the JPM is complete.

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____
_____

Response:_____
_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- A General Emergency was declared 33 minutes ago. The NRC Operations Center has not yet been notified.

Initiating Cues:

The Unit 2 SS directs you to make an immediate emergency notification phone call to the NRC operations center due to a declaration of a General Emergency 33 minutes ago.

NRC FORM 361
(12-2000)

U S NUCLEAR REGULATORY COMMISSION OPERATIONS CENTER

EVENT NOTIFICATION WORKSHEET

NRC OPERATION TELEPHONE NUMBER: PRIMARY -- 301-816-5100 or 800-532-3469*, BACKUPS -- [1st] 301-951-0550 or 800-449-3694*, [2nd] 301-415-0550 and [3rd] 301-415-0553
* Licensees who maintain their own ETS are provided these telephone numbers

NOTIFICATION TIME	FACILITY OR ORGANIZATION	UNIT	NAME OF CALLER	CALL BACK #
	Prairie Island NPG	1		

EVENT TIME & ZONE	EVENT DATE	POWER/MODE BEFORE	POWER/MODE AFTER
		[illegible]%	[illegible]%

	EVENT CLASSIFICATIONS			1-Hr. Non-Emergency 10 CFR 50.72(b)(1)					
X	GENERAL EMERGENCY	GEN/AAEC		TS Deviation	ADEV		(v)(A)	Safe S/D Capability	AINA
	SITE AREA EMERGENCY	SIT/AAEC		4-Hr. Non-Emergency 10 CFR 50.72(b)(2)			(v)(B)	RHR Capability	AINB
	ALERT	ALE/AAEC		(i) TS Required S/D	ASHU		(v)(C)	Control of Rad Release	AINC
	UNUSUAL EVENT	UNU/AAEC		(iv)(A) ECCS Discharge to RCS	ACCS		(v)(D)	Accident Mitigation	AIND
	50.72 NON-EMERGENCY (see next columns)			(iv)(B) RPS Actuation (scram)	ARPS		(xii)	Offsite Medical	AMED
	PHYSICAL SECURITY (73.71)	DDDD		(xi) Offsite Notification	APRE		(xiii)	Loss Comm/Asmt/Resp	ACCM
	MATERIAL/EXPOSURE	B???		8-Hr. Non-Emergency 10 CFR 50.72(b)(3)			60-Day Optional 10 CFR 50.73(a)(1)		
	FITNESS FOR DUTY	HFIT		(ii)(A) Degraded Condition	ADEG		Invalid Specified System Actuation		AINV
	OTHER UNSPECIFIED REQMT (see last column)			(ii)(B) Unanalyzed Condition	AUNA		Other Unspecified Requirement (Identify)		
	INFORMATION ONLY	NNF		(iv)(A) Specified System Actuation	AESF				NONR
									NONR

DESCRIPTION

Include: Systems affected, actuations and their initiating signals, causes, effect of event on plant, actions taken or planned, etc.

[illegible] tube in tubes [illegible]

[illegible]

[illegible]

[illegible] sectors [illegible] 5 miles.

[illegible] release rates will be transmitted in the next update.

NOTIFICATIONS	YES	NO	WILL BE
NRC RESIDENT	✓		
STATE(s)	✓		
LOCAL	✓		
OTHER GOV AGENCIES	✓		
MEDIA/PRESS RELEASE			✓

ANYTHING UNUSUAL OR NOT UNDERSTOOD? ☑ YES (Explain above) ☐ NO

DID ALL SYSTEMS FUNCTION AS REQUIRED ☐ YES ☑ NO (Explain above)

MODE OF OPERATION UNTIL CORRECTED: 3

ESTIMATED RESTART DATE:

ADDITIONAL INFO ON BACK ☐ YES ☐ NO

ADDITIONAL INFORMATION

RADIOLOGICAL RELEASES CHECK OR FILL IN APPLICABLE ITEMS *(Specific details/explanations should be covered in event description)*

	LIQUID RELEASE	✓	GASEOUS RELEASE	✓	UNPLANNED RELEASE		PLANNED RELEASE	✓	ONGOING		TERMINATED
	MONITORED	✓	UNMONITORED	✓	OFFSITE RELEASE		T S EXCEEDED		RM ALARMS		AREAS EVACUATED
	PERSONNEL EXPOSED OR CONTAMINATED			✓	OFFSITE PROTECTIVE ACTIONS RECOMMENDED				* State release path in description		

	Release Rate (Ci/sec)	% T S LIMIT	HOO GUIDE	Total Activity (Ci)	% T S LIMIT	HOO GUIDE
Noble Gas			0 1 Ci/sec			1000 Ci
Iodine			10 µCi/sec			0 01 Ci
Particulate			1 µCi/sec			1 mCi
Liquid (*excluding tritium & dissolved noble gases*)			10 µCi/min			0 1 Ci
Liquid (tritium)			0 2 Ci/min			5 Ci
Total Activity						

	PLANT STACK	CONDENSER/AIR EJECTOR	MAIN STEAM LINE	SG BLOWDOWN	OTHER
RAD MONITOR READINGS					
ALARM SETPOINTS					
% T S. LIMIT (*if applicable*)					

RCS OR SG TUBE LEAKS CHECK OR FILL IN APPLICABLE ITEMS *(Specific details/explanations should be covered in event description)*

LOCATION OF THE LEAK (*e g , SG #, valve, pipe, etc*) 11 SG

LEAK RATE:	UNITS gpm/gpd	T S LIMITS	SUDDEN OR LONG TERM DEVELOPMENT
[illegible]	GPM		[illegible]

LEAK START DATE TIME	COOLANT ACTIVITY AND UNITS PRIMARY	SECONDARY

LIST OF SAFETY RELATED EQUIPMENT NOT OPERATIONAL

NONE

NOTE: PLANT INFORMATION ONLY

Event Number _____

NRC Contact Person: _____

Telecopy to NRC Operations Center, White Flint (301-816-5151): _____(initial)

Telecopy to Xcel Asset Manager (612-330-6938): _____(initial)

Telecopy to Xcel Communications (612-215-4522): _____(initial)

Telecopy to Xcel Regulatory Administration Manager (612-330-7601):_____(initial)

Telecopy to NMC Regulatory Services (715-377-3355): _____(initial)

Notify NMC Regulatory Services that form was faxed (715-377-3379): _____(initial)

Copy Given to Operations SS or SM: _____(initial)

Copy Given to Site Communications: _____(initials)

Copy Given to NRC Resident Inspector: _____(initial)

Copy Sent to Gen. Supt. Operations: _____(initial)

Copy Given to Rad. Prot. Emerg. Planner: _____(initial)

Original Given to Site Licensing: _____ _____
(Initial) (Date)

JPM A.4 SRO

copy 1

Appendix C | Job Performance Measure Worksheet | Form ES-C-1 (R8, S1)

Facility: Prairie Island | Task No: _____

Task Title: Classify an Event, Initiate Protective Action Recommendations, and Complete Emergency Notification Report Form PINGP 577

Job Performance Measure No: SRO A.4

K/A Reference: 2.4.38 [4.0]

Examinee: _____ | NRC Examiner: _____

Facility Evaluator: _____ | Date: _____

Method of testing:

Simulated Performance _X_ Actual Performance __ Classroom _X_ Simulator __ Plant __

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions:

- Unit 1 has had an automatic Reactor Trip and Safety Injection from 100% power
- 1E-0, "Reactor Trip or Safety Injection" is in effect at step 8
- Unit 1 plant conditions are as follow:
  - Offsite power has been lost to Unit 1
  - RCS pressure is at 1100 psig and slowly decreasing
  - Core exit TCs are at 750°F and slowly increasing
  - Containment pressure is at 10 psig and slowly decreasing
  - No SI pumps are available
  - All three (3) Charging Pumps are running with charging flow at 120 gpm
  - RVLIS full range level is at 35% and decreasing
  - A and B SG pressures are at 900 psig and stable
  - The containment in-service purge system was in operation prior to the Reactor Trip and Safety Injection
  - Containment in-service purge exhaust valves CV-31310 and CV-31311 do NOT indicate full closed by their status lights
- Unit 2 is at 100% power with all equipment in normal lineup

Task Standard:
- CLASSIFY the event as a GENERAL EMERGENCY
- PROVIDE correct Protective Action Recommendations (PARs)
- DOCUMENT the classification and PARs on the Emergency Notification Report Form (PINGP 577)

Facility: Prairie Island | Task No: _____

Task Title: Classify an Event, Initiate Protective Action Recommendations, and Complete Emergency Notification Report Form PINGP 577

Job Performance Measure No: SRO A.4

K/A Reference: 2.4.38 [4.0]

Required Materials:
1. F3-2, "Classifications of Emergencies", Rev 28
2. PINGP 577, "Emergency Notification Report Form", Rev 30 (partially filled out)
3. F3-8.1, "Recommendations for Offsite Protective Actions for the On Shift Emergency Director / Shift Manager", Rev 12
4. PINGP 1125, "Control Room Shift Manager / Shift Supervisor Emergency Director Checklist", Rev 16

General References:
1. F3-2, "Classifications of Emergencies", Rev 28
2. PINGP 577, "Emergency Notification Report Form", Rev 30
3. F3-8.1, "Recommendations for Offsite Protective Actions for the On Shift Emergency Director / Shift Manager", Rev 12
4. F3-13.5, "Alternate Meteorological Data", Rev 4W
5. PINGP 1125, "Control Room Shift Manager / Shift Supervisor Emergency Director Checklist", Rev 16
6. F-0.4, "Core Cooling", Rev 4

Initiating Cues:

The Unit 1 Shift Supervisor has asked you, as the unaffected Unit 2 Shift Supervisor, to:
- CLASSIFY the event per F3-2, and
- NOTIFY the Unit 1 Shift Supervisor (evaluator) at the time you declare the Event Classification, and
- COMPLETE PINGP 577, "Emergency Notification Report Form", which has been partially filled out.
- The Shift Emergency Communicator (SEC) has obtained the Meteorological Data and it has been placed on the partially filled out PINGP 577 form.

This is a Time Critical Task.

Time Critical Task: YES/NO
(15 minutes to classify event)
(15 additional minutes to complete PINGP 577 after classification is complete)

Alternate Path: YES/NO

Validation Time: 15 Minutes Time Started _____ Time Finished: _____

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

__1__ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE the Emergency Classification Level and Emergency Action Level (EAL) per F3-2, "Classifications of Emergencies", Attachment 1 based on the Initial Conditions specified.

Standard:

DETERMINES the Emergency Classification Level to be a GENERAL EMERGENCY and the Emergency Action Level to be EAL Reference Manual Condition Number 6 based on the Initial Conditions specified.
NOTE: This is a Time Critical Task (15 minutes to classify event).

Comment:

__2__ Performance step: **CRITICAL STEP** SAT/UNSAT

DETERMINE Protective Action Recommendations per PINGP 577, PINGP 1125, or F3-8.1, Figure 1

Standard:

DETERMINE Protective Action Recommendations to be:
- **EVACUATE all sectors out to 2 miles, and**
- **EVACUATE the 5 downwind sectors MNPQR out to 5 miles, and**
- **CIRCLE SUBAREAS "5W and 5N" in addition to SUBAREA "2" that is already circled on the form**
- **ADVISE remainder of plume EPZ to monitor radio / TV broadcasts for further emergency information**

Comment:

PERFORMANCE INFORMATION

(Denote critical steps with **BOLD**)

___3_ Performance step: **CRITICAL STEP** SAT/UNSAT

DOCUMENT the classification and PARs on the Emergency Notification Report Form (PINGP 577).

Standard:

DOCUMENT the classification and PARs on the Emergency Notification Report Form (PINGP 577) per the following:

- **Section 1.2 - We have "(a) Declared" a "(4) General Emergency"**
  - At _Time_ hours on _Date_

- **Section 1.3 - The emergency "(b) DOES involve an airborne radioactive release**

- **Section 1.4 - The protective action recommendation at this time is:**

  - **(a) Evacuate ALL sectors out to 2 miles,**
    Evacuate sectors "M,N,P,Q,R" out to 5 miles
  - **CIRCLE SUBAREAS "5W and 5N" in addition to SUBAREA "2" that is already circled on the form**
  - **Advise remainder of plume EPZ to monitor radio / TV broadcasts for further emergency information**

Section 2.1 - The EAL Reference Manual Condition Number is _6_
- This event is related to: (X) Unit 1

Section 2.2 - Affected sectors _M,N,P,Q,R_

Section 2.3 - Sign approval of form

Comment:

Terminating cue:

VERIFICATION OF COMPLETION

Job Performance Measure No. _____

Examinee's Name:

Examiner's Name:

Date performed:

Facility Evaluator:

Number of attempts:

Time to complete:

Question Documentation:

Question:_____
_____
_____

Response:_____
_____
_____
_____

Result: SAT or UNSAT

Examiner's signature and date: _____ _____

Initial Conditions:

- Unit 1 has had an automatic Reactor Trip and Safety Injection from 100% power
- 1E-0, "Reactor Trip or Safety Injection" is in effect at step 8
- Unit 1 plant conditions are as follow:
  - Offsite power has been lost to Unit 1
  - RCS pressure is at 1100 psig and slowly decreasing
  - Core exit TCs are at 750°F and slowly increasing
  - Containment pressure is at 10 psig and slowly decreasing
  - No SI pumps are available
  - All three (3) Charging Pumps are running with charging flow at 120 gpm
  - RVLIS full range level is at 35% and decreasing
  - A and B SG pressures are at 900 psig and stable
  - The containment in-service purge system was in operation prior to the Reactor Trip and Safety Injection
  - Containment in-service purge exhaust valves CV-31310 and CV-31311 do NOT indicate full closed by their status lights
- Unit 2 is at 100% power with all equipment in normal lineup

Initiating Cues:

The Unit 1 Shift Supervisor has asked you, as the unaffected Unit 2 Shift Supervisor, to:

- CLASSIFY the event per F3-2, and
- NOTIFY the Unit 1 Shift Supervisor (evaluator) at the time you declare the Event Classification, and
- COMPLETE PINGP 577, "Emergency Notification Report Form", which has been partially filled out.
- The Shift Emergency Communicator (SEC) has obtained the Meteorological Data and it has been placed on the partially filled out PINGP 577 form.

This is a Time Critical Task.

EMERGENCY NOTIFICATION REPORT FORM

INSTRUCTIONS

1. Complete all sections of this form for Alert, S.A., or General Emergency and NUEs involving a hazardous release; otherwise, Section 2.2 (Met Info) is not necessary.
2. Use Table 1 on Back of Page 2 to determine geopolitical subareas.
3. Notify State/Local authorities within 15 minutes, with information contained on Pages 1 and 2.
4. Fax only Page 1 and Page 2 Front to State/Local authorities.

1.1 PLANT IDENTIFICATION

This is Edward Ford, **Emergency Communicator at the Prairie Island Nuclear Generating Plant.** (651-388-1121)

__X__ (a) This is a Real Emergency.

_____ (b) This is a Drill.

1.2 EVENT CLASSIFICATION

We have

_____ (a) Declared a(an)
_____ (b) Escalated to a(an)
_____ (c) No classification change, PAR update only
_____ (d) Terminated the

_____ (1) Notification of Unusual Event
_____ (2) Alert
_____ (3) Site Area Emergency
_____ (4) General Emergency
_____ (5) and entered the Recovery Phase

At _____ **hours on** _____ **(date).**

1.3 RELEASE INFORMATION (Report a radioactive release if any RCS activity or Rad Waste System activity is released to the environment during an emergency.)

The emergency

_____ (a) **DOES NOT** involve a radioactive release.

_____ (b) **DOES** involve a _____ radioactive release.
liquid/airborne

1.4 PROTECTIVE ACTION RECOMMENDATION

The protective action recommended at this time is:

_____ (a) Evacuate __ALL__ sectors out to _____ miles

_____ sectors out to _____ miles

(circle) SUBAREAS (2) 5N 5E 5S 5W 10NW 10N 10NE 10E 10SE 10SW 10W

Advise remainder of plume EPZ to monitor radio/TV broadcasts for further emergency information.

_____ (b) Other (Casino shutdown if EAL is 2C, 4D, 4E, 5C, 7C, 7D, 8E, or 16C):

_____

_____

_____ (c) None

EMERGENCY NOTIFICATION REPORT FORM

2.1 EVENT DESCRIPTION (Use the generic Initiating Condition and the EAL Ref. Manual # from F3-2.)

The initiating event causing the emergency is:

Unit 1 has had an automatic Reactor Trip and Safety Injection from 100% power. Offsite power has been lost to Unit 1. RCS pressure is at 1100 psig and ↓. Core exit TCs are at 750°F and ↑. Containment pressure is at 10 psig and ↓. No SI Pumps are available. RVLIS full range is at 35% and ↓. Containment in-service purge exhaust valves CV-31310 and CV-31311 do NOT indicate full closed by their status lights.

The EAL Reference Manual Condition Number is _____.

This event is related to: ( ) Unit 1 ( ) Unit 2 ( ) Both Units

2.2 METEOROLOGICAL INFORMATION (Complete this section for an Alert, S.A. or General Emergency and an NUE involving a hazardous release; otherwise NA may be indicated. Use the 10 meter 15 minute average MET DATA, from the 10a sensor if reliable, otherwise use 10b, 60a, 60b, or 22 meter tower. Use 60a for stability class, otherwise use 60b. If MET DATA not available via MIDAS, access MET DATA via ERCS per F3-13.5 "GRPDIS METDATA".)

Present Meteorological data is:

a. **Wind Speed** 8 mph

b. **Wind direction (from)** 121 °

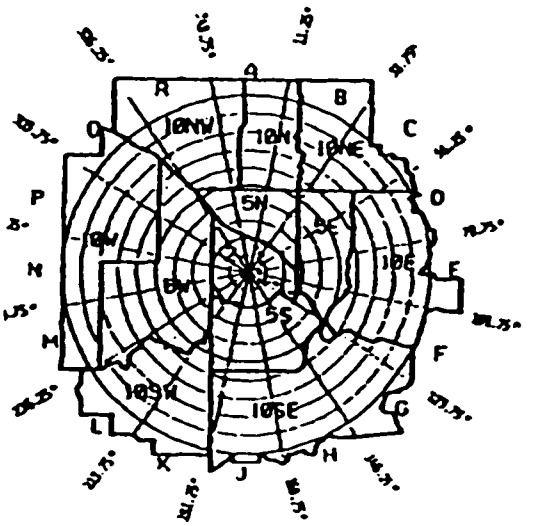
c. **Temperature** 72 °F

d. **Precipitation** None

e. **Stability Class:** A B C D E (F) G
(Circle One)
unstable ⇐ ⇒ stable

f. **Affected sectors** _____

_____



2.3 PLEASE RELAY THIS INFORMATION TO YOUR EMERGENCY ORGANIZATION PERSONNEL.

NOTE:	**ED/EM should ensure date & time are correct in Section 1.2.**

EMERGENCY DIRECTOR/MANAGER APPROVAL _____
NAME